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TEXTILE WORLD RECORD

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The Annual Official Directory of the Textile Industries for 1903. Office Edition, $2.50. Traveler's Edition, $2.00.

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Mercerizing Machinery for Piece Goods and Yarn in the warp or chain

Singeing Machines,

Boiling Kiers,

Washers, Squeezers,

Chemic and Sour

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Continuous Chainless

Steamer,

Aniline Agers,

Dyeing Machines,

Open Soapers,

Blanket Washers,

Color Kettles,

Horizontal or Vertical Drying Machines, with Copper or Tinned Iron Cylinders,

Automatic Tentering Machines,

Water and Starch Mangles,

Dampening Machines,

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DYEING

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AND

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Calenders for Rolling, Glazing, Chasing and Embossing, also Calenders for Moire Finish.

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PATENT WINDING MACHINE
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For use in connection with Singeing Machines, Soaping Machines, Drying Machines, Etc.

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REELS,
SLASHER WARPERS,
LEESE WARPERS,
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REGULAR LOOMS,
DUCK LOOMS,
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FOLDERS,
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SEWING MACHINES,
SIZE PUMPS,
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Complete Textile Equipment and Plans for Cotton Mills.

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GILL-BOXES for preparing before combing, and finishing afterwards.
MODIFICATIONS will be made of the above machinery to suit different kinds of work.
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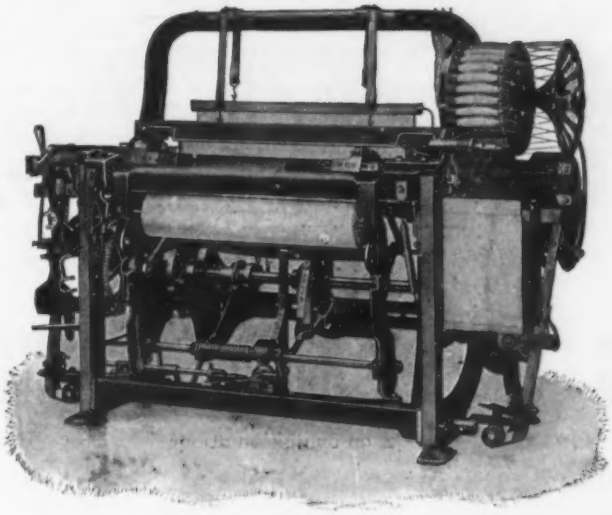

Our Latest

NORTHROP LOOM

ALTHOUGH our order list lengthens and strengthens, we do not adopt the simple and inexpensive plan of building without change, but continually add improvements whenever possible. A careful study of the above illustration will prove of interest to adepts in the Art of Weaving.

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We beg to inform the trade that our

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is now on exhibition at our

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Where it can be seen in operation on Cotton, Silk and Worsted Looms of different makes. An inspection of these looms will convince every manufacturer of the following

GREAT ADVANTAGES:

1. Our device can be put on any modern Cotton, Silk or Worsted Loom.
2. Our shuttles change on the pick while the loom is running at regular speed and absolutely *leave no broken picks.*
3. It *does not affect the speed* of the loom at any time.
4. Our attachment is so *very simple* that it needs no more care than an ordinary loom and there is *no intricate mechanism* in our attachment which is liable to come out of order.
5. A weaver can attend, without extra exertion, to a *greater number of looms* with our device than with an ordinary loom.
6. It thus enables the weaver to earn *more wages.*
7. It is *time saving* and gives an *increase in the production* which is very considerable.
8. It reduces the manufacturing expenses *to a large extent.*
9. *Waste* on the quills is *reduced* to almost nothing.
10. As the loom stops less frequently, its operation is more regular, consequently producing *better* goods and also keeping the *looms in better condition.*

The superiority of our Automatic Shuttle and Loom Attachment over all existing similar devices is its simplicity and the fact that it absolutely leaves no mispicks whatsoever, which has been a cause of surprise and admiration to all experts who have seen our Attachment in operation.

We Guarantee Our Automatic Shuttle and Loom Attachment to Do Exactly What We Mention Above.

For inspection, please communicate with our Office,
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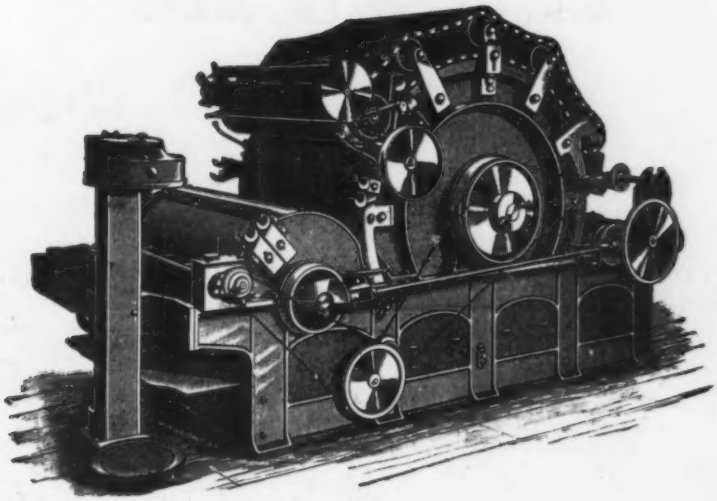

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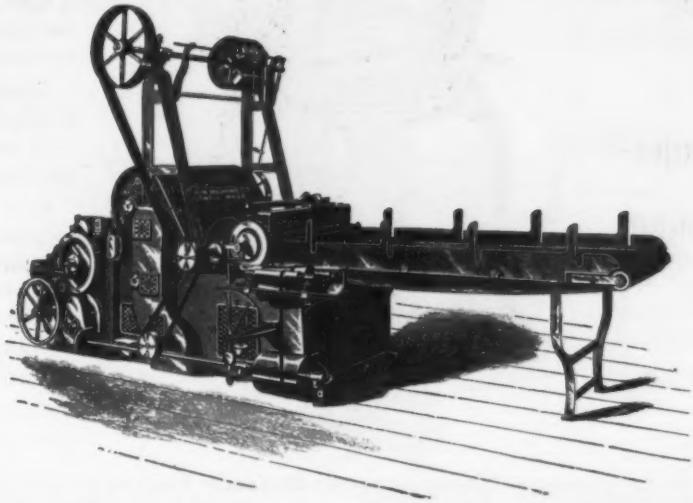
In the Cotton Field nothing equals the DARKY COTTON PICKERS.



In the Cotton Mill nothing equals the KITSON COTTON PICKERS.

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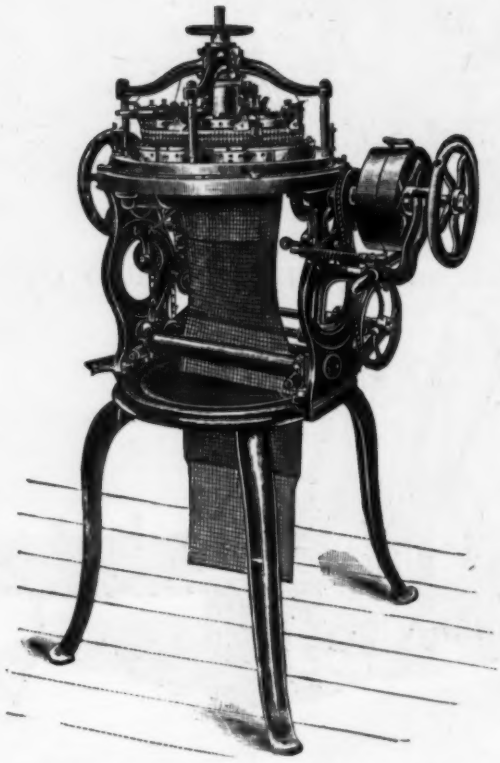

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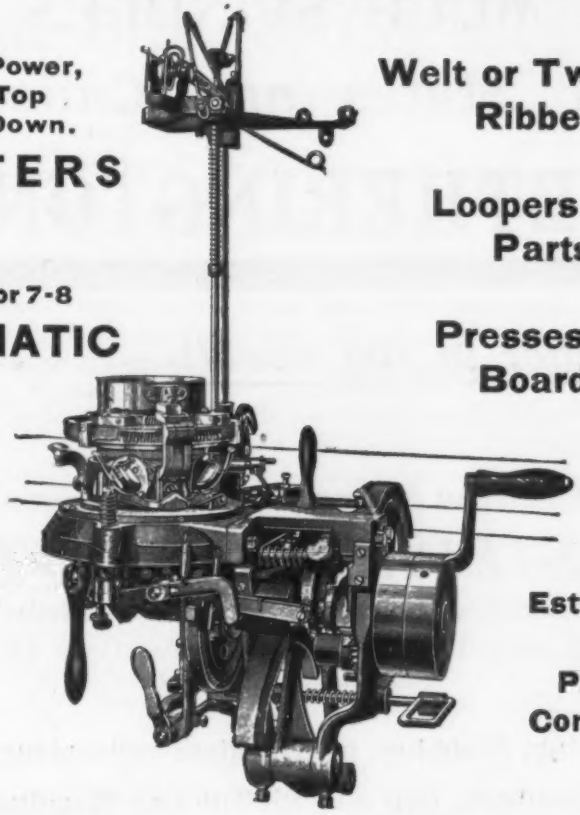

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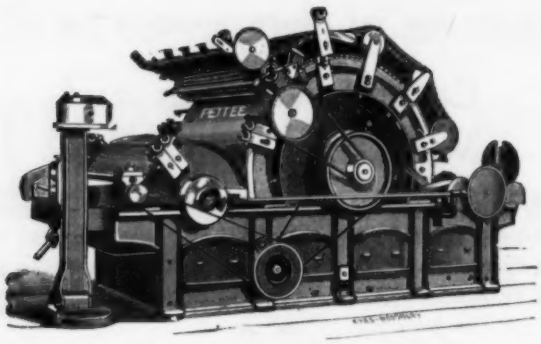

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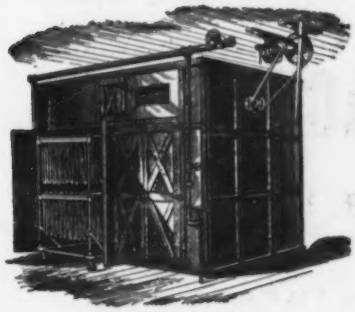

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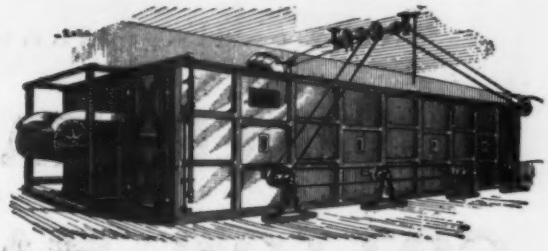

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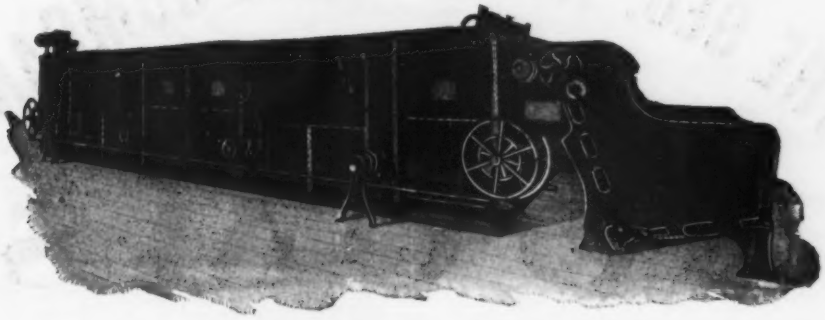

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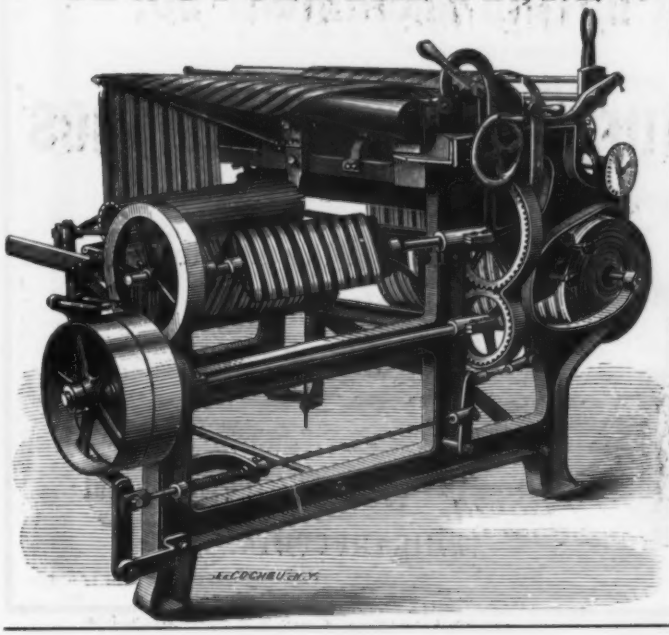

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and imprint the measurement upon fabrics, fold lengthwise and roll into merchantable packages all in one operation.

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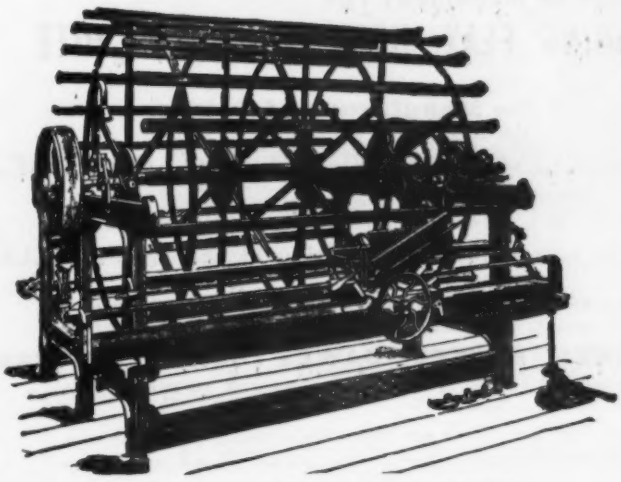

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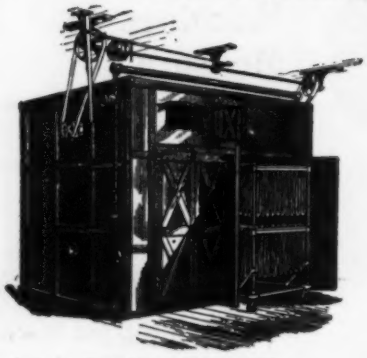

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7 1-2 CENTS PER SPINDLE.

PATENTED JULY 9, 1901.
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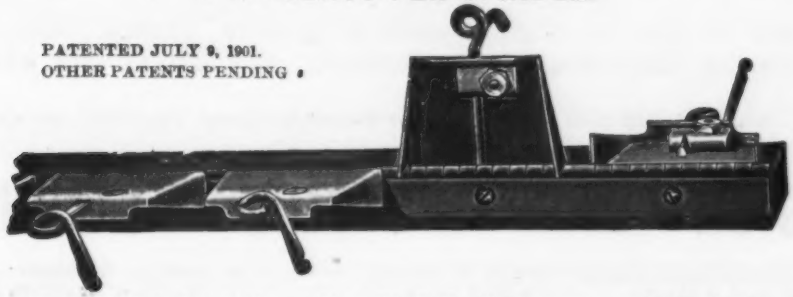

The only Thread Board that ***holds a guide solid*** all the time; ***never*** gets loose; is always in perfect adjustment, and thus must make a saving in travelers, broken ends, waste, thread guide, care and also prolong the wear of rings and increase the production per spindle. These claims are based on the truth of mechanical principles, and have been proven true by actual use in many mills whose superintendents will substantiate these claims.

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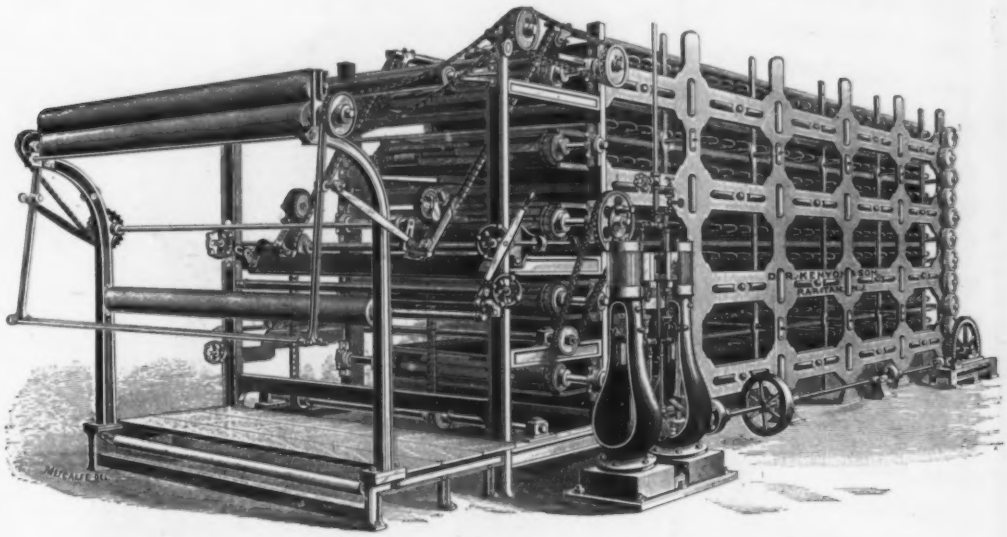

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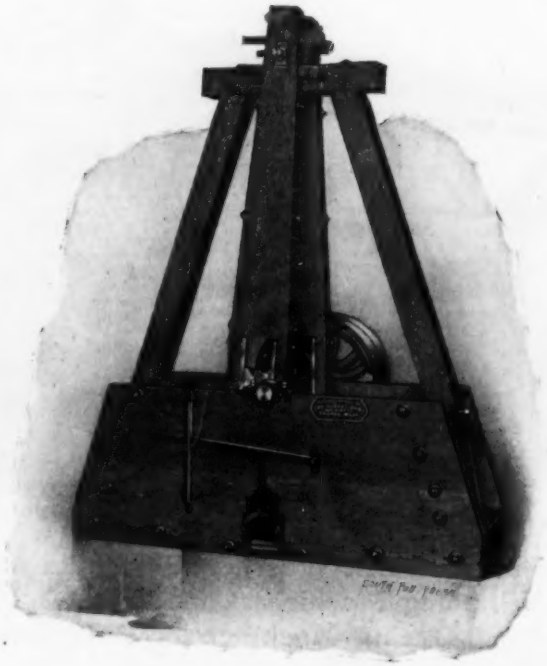

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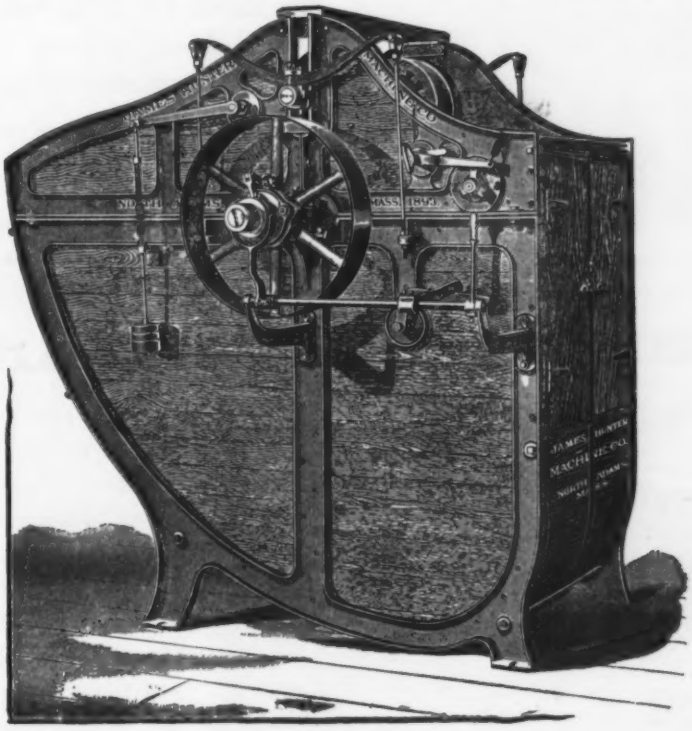

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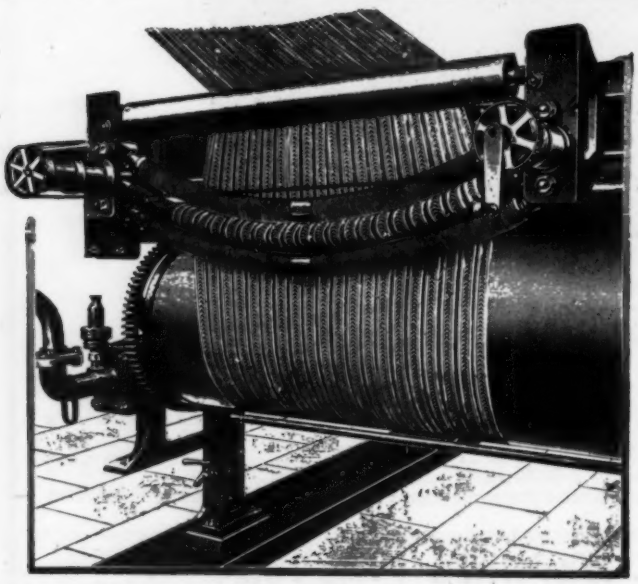

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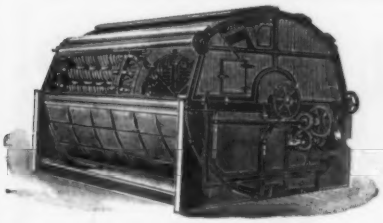
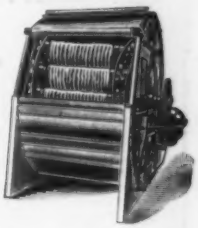


SAVES
75 per cent in Labor,
30 per cent in Winding,
Steam and Dye Stuffs,
Perfectly Even Dyeing.

CAPACITY:
50 to 700 pounds per batch.



No Friction on the Skeins. No Tangling of the Yarn.

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For Skein — Worsted, Slubbing, Cotton and Silk.
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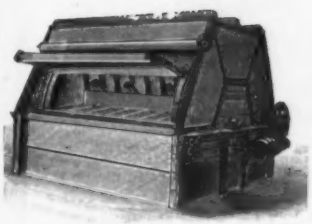

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50 per cent in Labor,
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Practically Indestructible.

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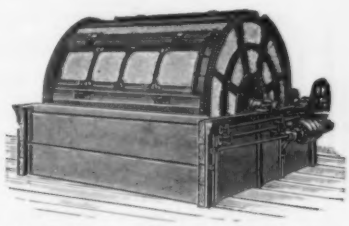

Leaves Stock in Perfect Condition. Does Not Mat or Tangle the Fibre.

A Perfect Machine.

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FILLING COP WINDING MACHINES. Spindles driven by belts or by gears, and bobbins can be made to wind any kind of filling from the coarsest to finest numbers, from Skeins, Spools, Cones, Mule Cops, or any other Spinning or Twister Bobbins. These machines can be arranged to wind cops or butts from the largest used in weaving to the smallest cops or butts for cotton filling used in the silk trade.

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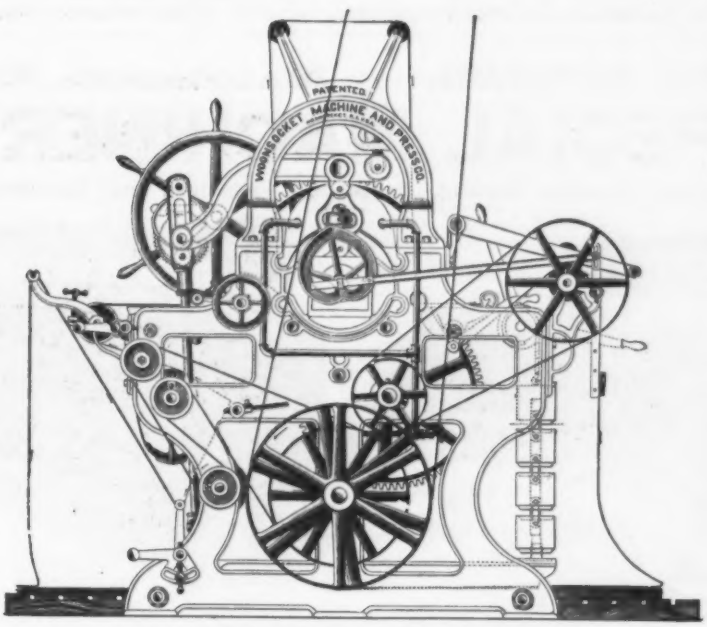

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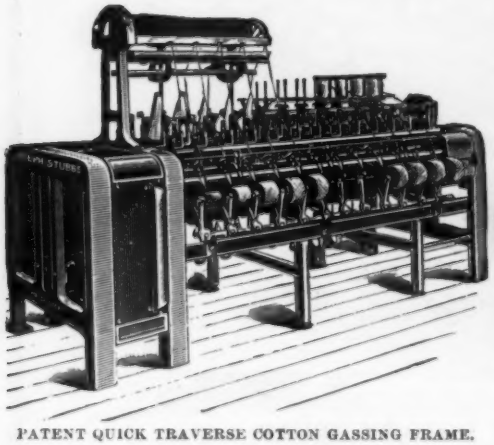

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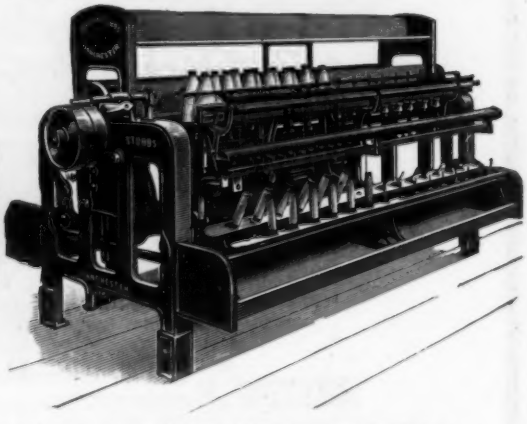

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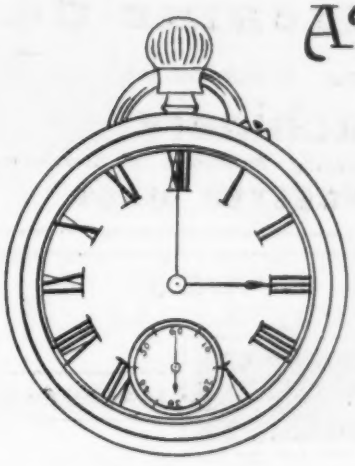

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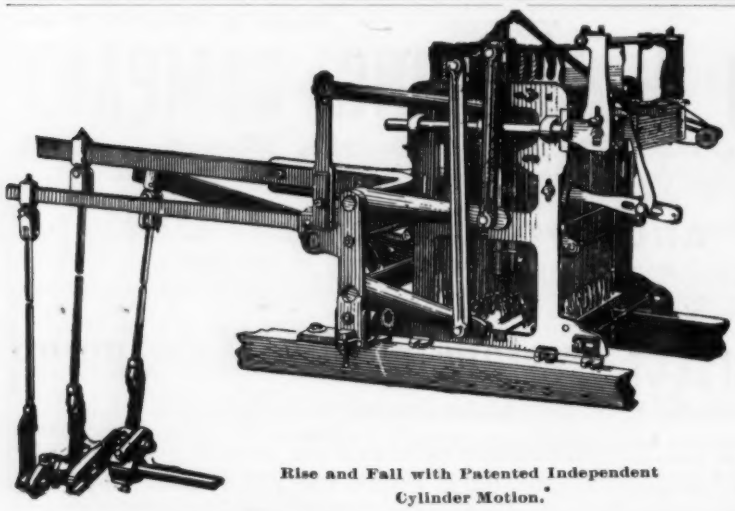

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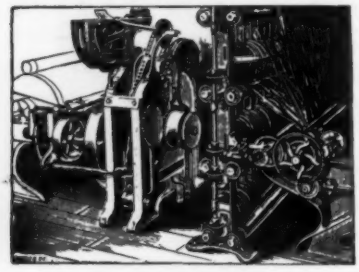

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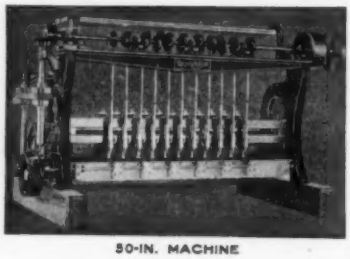

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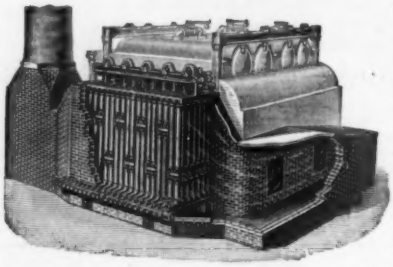

which is the greatest assistant to true economy yet produced. The gain in steam, with the corresponding reduction of fuel, seems incredible, but with our Economizer you can easily save from 10 to 20% in Fuel, and yet, through the use of waste gasses entirely, keep the feed-water heated above the boiling point. What this means to the **Textile Mill, Bleacheries** and **Dyehouses,** is best ascertained through the testimonials of those having one in their boiler room. Our booklet, sent free, shows not only how it is done, but gives you a list of users, and their testimonies as to the value to them. Our great advantage—applied without stoppage to works Write us for plans and specifications.

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The total loss by fire during the year 1901, in the U. S., was One Hundred Sixty-Six Millions of Dollars. Of this amount, the Insurance Companies paid the owners One Hundred Million Dollars in full settlement; and the insured stood SIXTY-SIX MILLION DOLLARS themselves. WHY?

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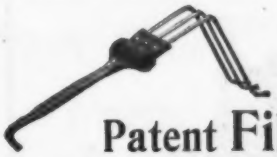

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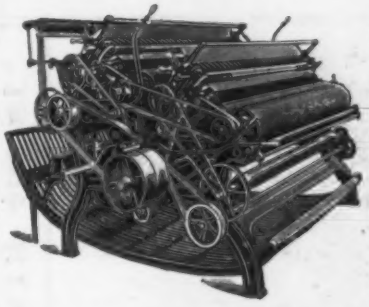

The Finest Shearing Machine in the World. Get into line. Use Double Shears. We will take your Single Shears in trade. Our representative can interest you. He will call at a word from you.

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Mill Sewing Machines

No. 9—Portable Foot-Power Rotary Sewing Machine.

It is especially adapted for use in Cotton and Woollen Mills, Bleacheries, Print Works at the Printing Machines, in Dye Works, Cloth Rooms, at the Fulling Mill, Shears, Calendars, Gigs, Drying Machines, etc., or any of the different finishing processes in textile mills.

Manufactured by the

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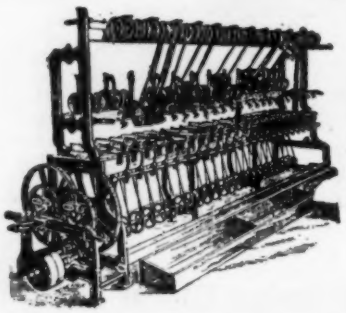
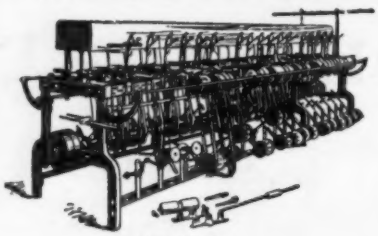
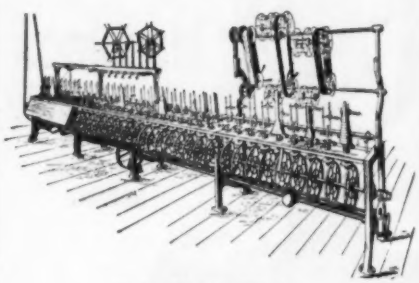


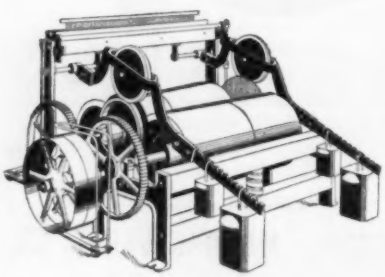
Shuttle Bobbin Winder with Variable Motion.



Cop Winder.



Hosiery Bobbin Winder.



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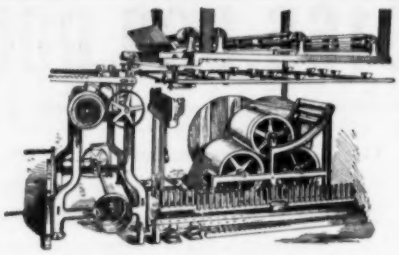
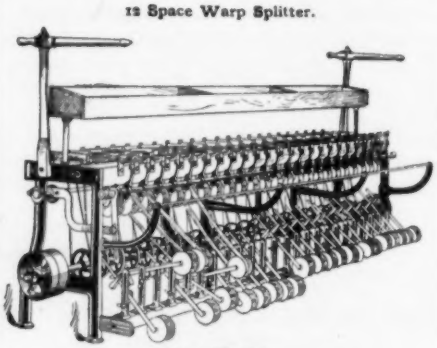
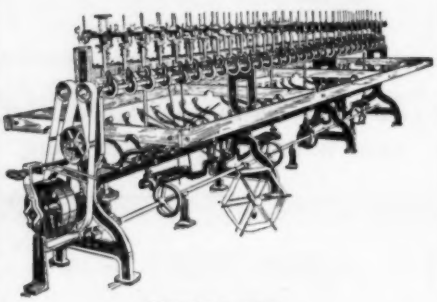


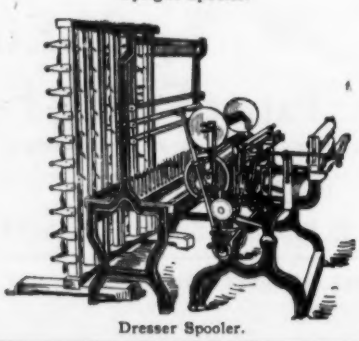
12 Space Warp Splitter.



Butt Winder.



Upright Spooler.



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Which are adapted for making all kinds of

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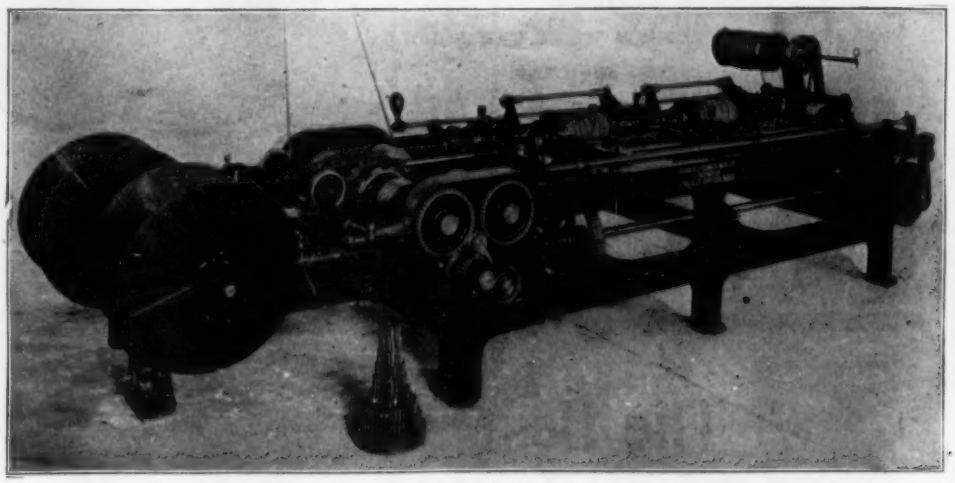

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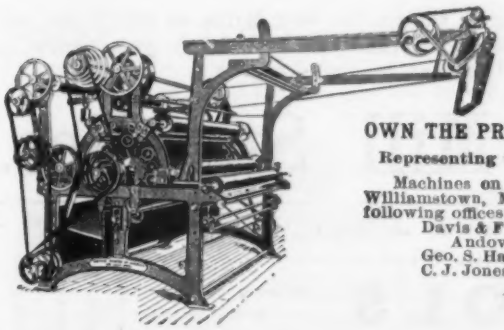

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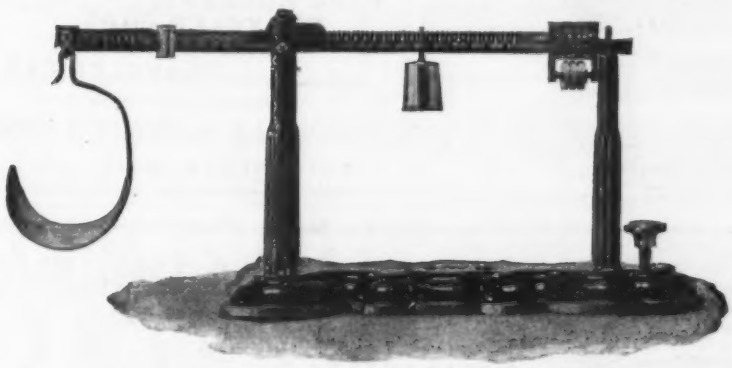

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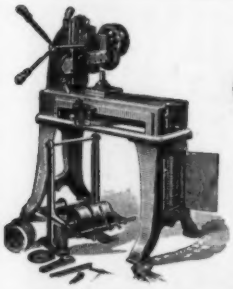

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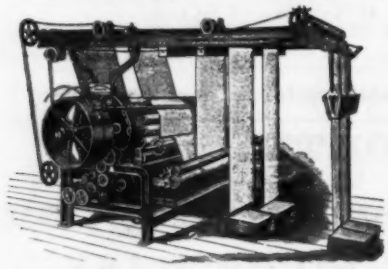

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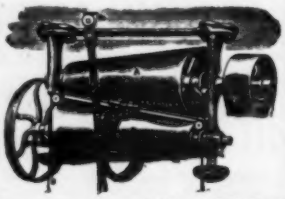

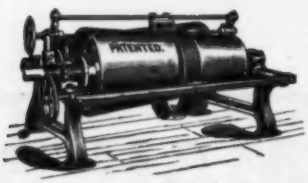

Smith & Winchester Co., So. Windham, Conn., 280 sets. Furguson & McRae, Belfast, Ireland, 25 sets. Mercantile Laundry, So. Windham, Conn., 250 sets. Washburn & Moen, Worcester, Mass., large number, all sizes. Dennison Tag Co., Boston, Mass., large number, small sizes. Seco & Petteo Machine Co., Newton, Mass., 275 sets. Pacific Mills, Lawrence, Mass., 15 sets.

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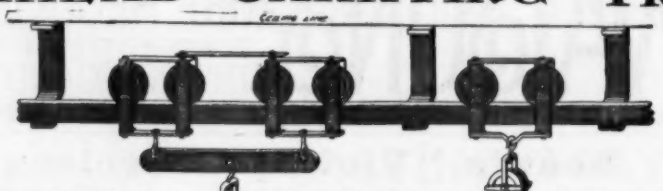

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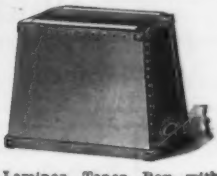

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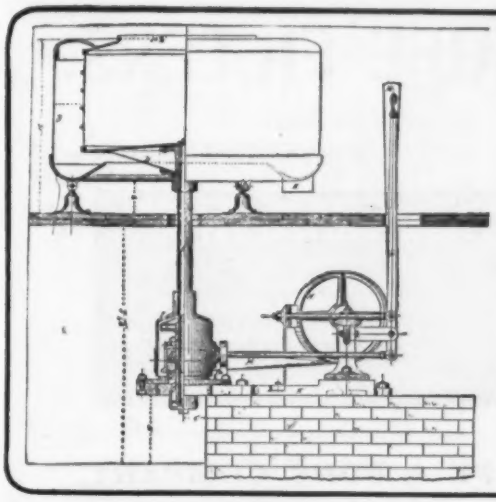

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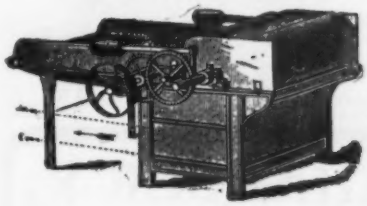

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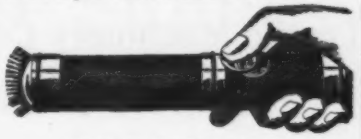

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Presents new principles and methods in construction that make its use of marked advantage. It is one of the most important of recent improvements presented to the textile industry.

Lighter and Stronger

and being perfectly balanced can be run at a very high speed. EVENER and STRONGER YARN is produced with less breaking of ends, and it is particularly adapted to FINE WORK. INCREASED PRODUCTION and added STRENGTH OF YARN. Price list and further information may be promptly obtained by addressing

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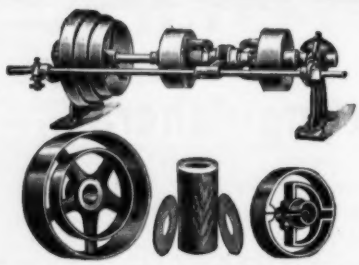

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Oil on your loose pulleys only makes trouble, and you're never done paying.

ARGUTO OILLESS BEARINGS stop the trouble once for all, stop the soaking of floors, belts and goods with oil, and stop the paying too.

Do you know them? Whose fault is it?

Stop paying for oil, and buy a postage stamp. A sample bearing sent free.

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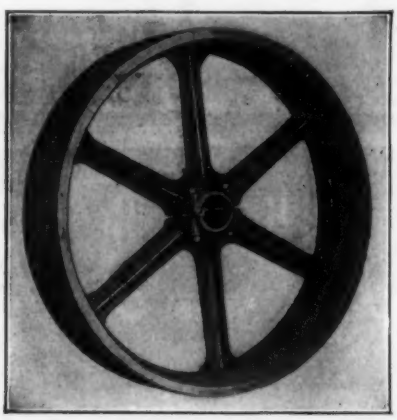

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Especially Adapted for Textile Work.

Oneida Steel Pulley Company,
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Complete Power Transmission Equipments

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We are enabled to give prompt and personal attention to every inquiry. Capable engineers, located both at this office and the various branches enumerated below, are ready at a moment's notice to advise and submit estimates of cost upon such proposed outfits as may be required.

Our facilities are the largest in the world in this exclusive line of manufacture, with equipment thoroughly modern, thereby enabling the execution of orders to meet any requirement.

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An experience of twenty-three years has taught us how to secure the maximum from the minimum — that is, the maximum of effective power transmitted from the minimum of coal pile energy, a fact we shall be pleased to demonstrate.

We originated the "Independence" Wood Split Pulley, now universally used the world over. We were also the pioneer manufacturers and patentees of the "Dodge" American System of Manila Rope Transmission—acknowledged as the most economical and modern means of transmitting and distributing power. We have installed thousands of these drives.

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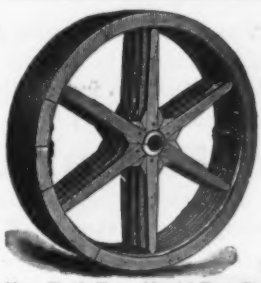

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Our booklets free. Its reading has convinced over 2000 firms, and even the U. S. Government that there's a better, quicker and cheaper method of lacing belts than the slow, old-fashioned, expensive hand and lace leather methods.

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This quantity will serve for as much belting as $75.00 worth of lace leather, a sum which practically pays for the machine, in addition to installing in your factory the strongest and quickest method of belt lacing known.

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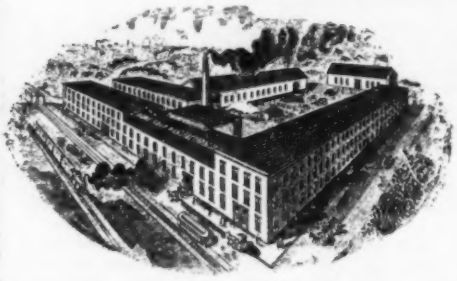

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MILL BASKET

FIG. 20.

Embodies desirable features not found in any other basket. It is made of strong, smooth, cotton duck, doubled at all points of extra wear or strain.

The Frame is made of specially drawn round spring steel, put together with our semi-flexible eye joints, making it strong and sufficiently rigid, yet springy and resilient, and will stand the most severe use.

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When you are buying BASKETS be sure to buy the BEST.

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BALLOU CANVAS BASKETS

re the strongest, and neatest appearing—Frames of flat spring steel, hard wood runners, heavy Canvas.

Ballou POUNDED ASH BASKETS are known the country over as having no equal. Rims reinforced, shoes and straps riveted, closely woven, best shape—all right in every way. Send for Booklet.

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long enough, try a - - - Keystone, the best belt is none too good, tell us where and what it is to run; if it does not do your work it costs you nothing. Made only by the

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FOR ALL CLASSES OF

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Saving in the cost of building, shafting and belting and of investment for future extension.
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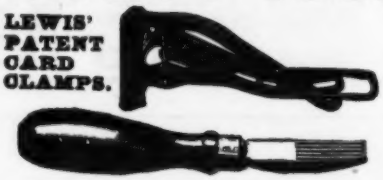

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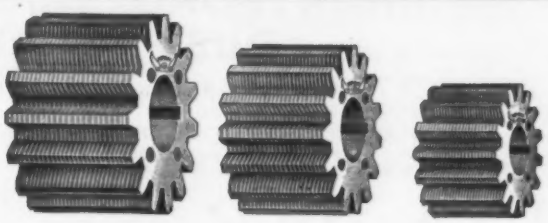

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Doesn't this fact appeal to you? Aren't there places about your plant or on your machines where the noise made by the gears is objectionable and where it would be a great relief to have quiet running gearing? If so, write for our little booklet, "Noiseless Gearing."

THE NEW PROCESS RAW HIDE CO.,
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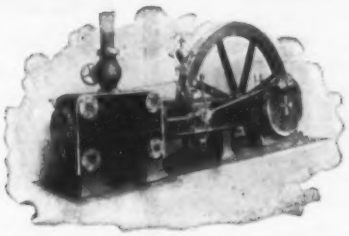

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handles shavings, sawdust, chips, lint, dust, leather buffings, corn seeds, emery dust, meal, corn, oats, cereals, etc., etc. Leaflet No. 53-J tell all about them. We install complete **EXHAUST SYSTEMS.** Drawings and Estimates free.

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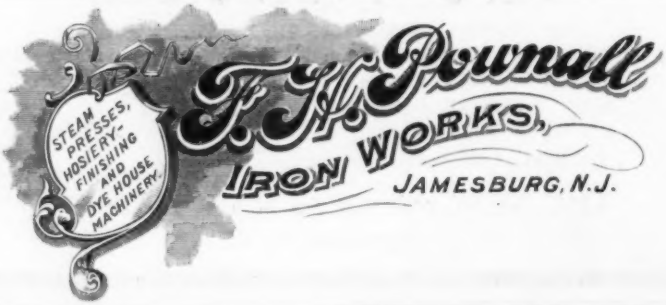

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Complete Dye Plants Erected.

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Textile Mills

Located along the lines of the

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Have met with steady and remarkable success. There are yet available in the territory traversed by the above roads,

Excellent Sites

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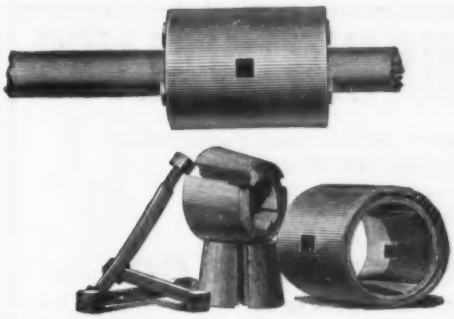

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has a way of holding shafts together, that no other COUPLING can equal.

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SHAFTS,
COUPLINGS,
PULLEYS,
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and all most approved appliances for the

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MACHINE TOOLS.
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THE subject of BELT DRESSING is not too trivial for the Buyer who wishes to run his mill to its full capacity for the least expense.

Time of idle hands is money.

Spoiled product is money lost.

In buying Stephenson Belt Dressing you are insured against further shut-downs to take up slack belts.

Its many good qualities can only be appreciated by its use.

May we have your next trial order, or shall we send you you a free sample by mail?

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ESPECIALLY ADAPTED FOR MILL USE.

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MANUFACTURERS OF
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Specialties made of Renecking, Refluting, Filing and Honing of all kinds of Rolls. Flyers Repaired and Fitted with any desired style of Pressers, Spindles Straightened Restepped and Retopped.

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Manufacturer of all kinds of SPINDLES, FLYERS, RINGS, TUBES, CAPS, etc., for Cotton, Silk, Flax, Woolen and Worsted Machinery.

Roving Spindles and Flyers a Specialty. Light Forgings.
REPAIRING OF ALL KINDS.

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THUN & JANSSEN, READING, PA.

Manfrs. of *BRAIDING MACHINES*

for making Dress Trimming Braids, Cotton Tapes, Underwear Braids, Shoe Laces, Spindle Banding, etc. Winders, Doublers. Measuring Machines, Reelers, Singeing and Finishing Machinery. Special machinery.

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Spools, Bobbins, Skewers, Shuttles,
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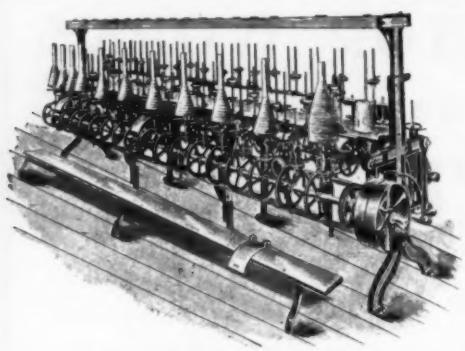

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OF ALL DESCRIPTIONS.

Special Machinery Built to Order.

Write for Particulars.

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Desk Telephone.
7 to 25 stations.

INTERIOR TELEPHONE SYSTEMS

FOR FACTORIES, OFFICES, ETC.

$25 to $200

No Plant is Considered Modern and Up-to-date Without Them.

Instantaneous communication with any department without leaving your desk. At the small price a busy man cannot afford to be without this great time-saving device.

Send for descriptive circular and price list.

THE ALLEN-HUSSEY COMPANY,
66 W. Jackson Boulevard, CHICAGO.

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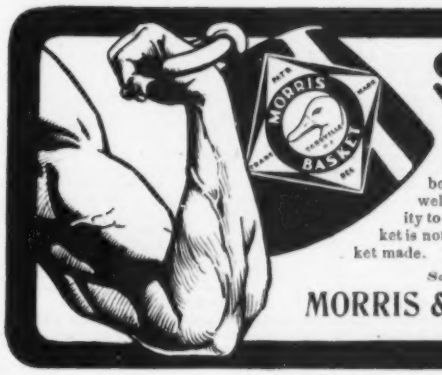
3 to 6 stations.

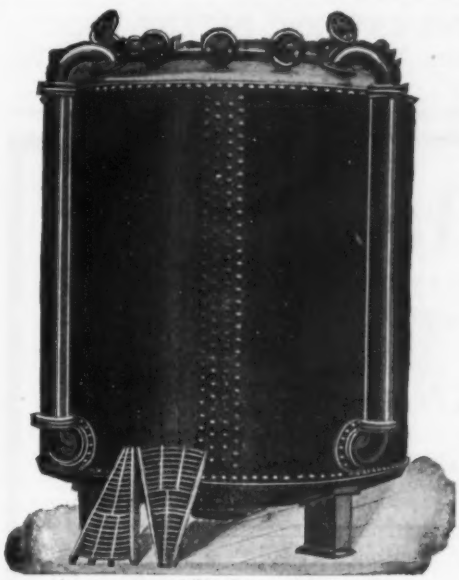


STRENGTH

If you want the strongest basket made, the **MORRIS SPRING BOTTOM DUCK BASKET** is what you want. At the same time it is light and convenient to handle and is constructed with spring bottom and sides which prevent breakage of contents and basket as well. The frames are of steel, made in two parts, which gives elasticity to the same; frames made to suit load or size of basket. This basket is not only the most convenient to handle, but will outwear any other basket made. This basket is made oblong, round or any shape or size desired.

Send to Dept. 9 for Descriptive Booklet and Prices.

MORRIS & CO., Manufacturers of Groveville Mills Cotton Duck Yardville, N. J.



Allen's Improved Bleaching and Boiling Kier.

Worcester Steam Boiler Works

Manufacturers of Manning and all other styles of

Upright and Horizontal Tubular

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SMOKESTACKS AND HEAVY SHEET IRON WORK

SPECIALTIES:

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KIERS

Embodying every improvement suggested by our own long experience in building Kiers, as well as the experience of the leading bleacheries in the country who are using our machinery. Built in all sizes.

Also STEAM BOXES for Yarns, Print Goods, etc.

William Allen & Sons Co., Proprietors, 65 Green St., WORCESTER, MASS.

Send for Circular and Prices.

Perfect Fast Black for Hosiery

The "Dubois' Sanitary" Oxidized Fast Black Dyeing Process with the Lisle Thread Silk Finish, Patented March 17, 1903, and The "Dubois Sanitary" One Dip Fast Black in Powder Form, Leads Them All!

This is the most reliable dyeing formula known to fast black dyers. It has been adopted successfully by many leading mills. It always gives uniform shade, oxidizes well and the fabric is almost as strong as though dyed with direct colors. Most important of all, it gives a fine lisle thread finish without in the least tendering the goods. Beware of cheap fast black formulas, which are sure to be dearer in the end.

The cost of the Dubois black, the best in the market, is very reasonable, as low as $1.40 per 100 pounds dyed in ordinary black for cheap trade, and not over $2.50 per 100 for the very best black for high grade goods, guaranteed to be ungreenable to acid tests and wear. Manufacturers of knit goods, hosiery and job dyers ***take notice*** that I am prepared to give licenses with full instructions for producing lisle thread finish (processes patented March, 1903) on any kind of direct colors or fast black, either before or after dyeing or bleaching.

Sulphur and diamine blacks particularly are so much improved after having been lisled by my patented process that they look just as well as aniline oxidized fast black, and yarn costing 17 1-2 cents per pound will produce as fine a looking fabric treated by my process as the genuine lisle thread at a cost of 34 cents per pound. This is a boon for direct color job dyers and bleachers, as well as for manufacturers of hosiery and knit goods.

The license will be given on a small royalty per 100 pounds.

All the machines used for the fast black and lisle thread finish, also for giving lisle thread finish to direct colors on bleached or unbleached goods are of my own invention, and are

PATENTED AS FOLLOWS:

June 18, 1901. Rotary oxidizing apparatus. The only machine in the world that carries the goods while oxidizing and lisling at all points of the compass. Quickest oxidizer known.

September 9, 1902. Rotary yarn oxidizing apparatus. Also carries the yarn at all points of the compass while in process of oxidizing or steaming.

June 10, 1902. A stationary hosiery oxidizing apparatus. Two different speeds. Especially constructed for lisle thread finish on hosiery or knit goods, equipped with an electric thermometer for the accurate measurement of the dry and wet hot air.

December 10, 1900. Stationary hosiery oxidizing apparatus. Two speeds. Chain and sprocket wheel drive with double clutch to start and stop. Very strong for heavy work, also built for lisle thread finish.

ALSO NOTICE: That My One Dip Sanitary Fast Black in Powder Form is the same black as the Sanitary Oxidize Fast Black Process mentioned at the head of this advertisement, and is a long felt want among the trade, particularly for small concerns whose production would not warrant the equipping of an Oxidize Fast Black Dyeing plant.

This One Dip Sanitary Fast Black is dyed in the open ordinary dye tub at boiling heat in one hour, then washed and softened, if desired, as is done with all other direct colors for cotton hosiery, and has the advantage on the other direct blacks to allow the production of any shade desired from a jet to a very blue black, and matching well the oxidized aniline black.

The cost per 100 pounds hosiery dyed with this black is from $3.50 to $3.80 according to amount of softener used.

This One Dip Sanitary Black is positively guaranteed to be ungreenable to acid test and wear and leave the fabrics as strong after dyeing as it was in the white.

The apparatus required to start dyeing are but two ordinary wood dyer's tubs and one hydro-extractor.

Those wishing to put on their goods so dyed my "Lisle Thread Finish" (Patented) can do so by simply adding to above apparatus one or more of my "Stationary Oxidizing Machines" (Patented June 10, 1902), and take out a license for the use of my patent for lisle thread finish on vegetable fabrics, which will be given free of charge, and all you will have to pay for the use of the machine and the lisle thread finish process, will be but a small royalty for each 100 pounds hosiery given the lisle thread finish.

Dyers and manufacturers that are far away may procure a license with full instructions for building the machines economically, paying a small royalty for the use. I have made the royalties low, so that ***no one may be debarred by reason of the price,*** but I mean to protect my patents and will vigorously prosecute any who infringe.

Fast black dye and bleach plants for hosiery, underwear and skein fast black yarn dyeing, installed and equipped complete, if desired. Apply to

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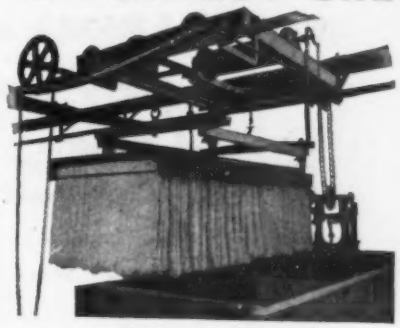

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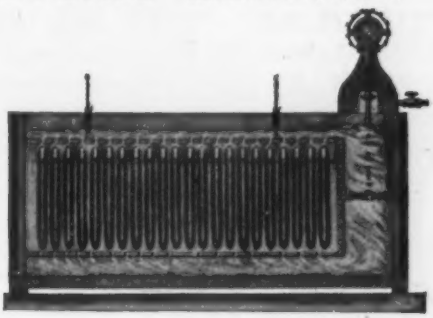

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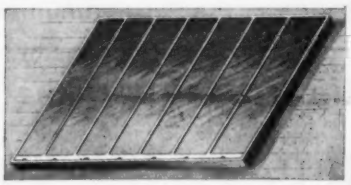

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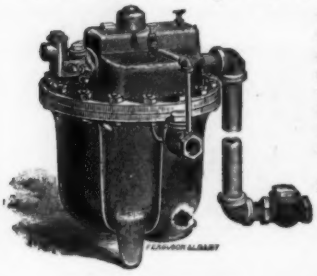

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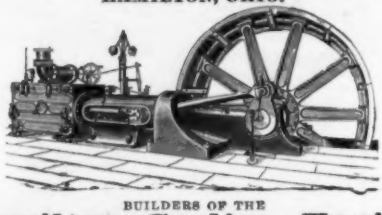

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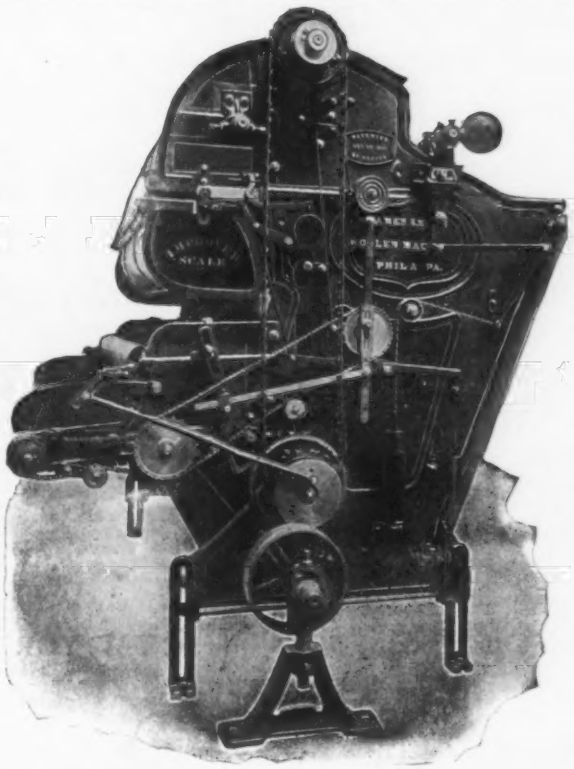

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PART V. Dealers and Brokers in raw materials and stock, including wool and shoddy dealers and brokers, cotton dealers and brokers, factors and buyers and wholesale rag dealers making a speciality of textile interests.

PART VI. Buyers Index of Textile Machinery and Supplies, and statistics showing textile machinery in the United States, giving spindles, looms, knitting machines, etc.

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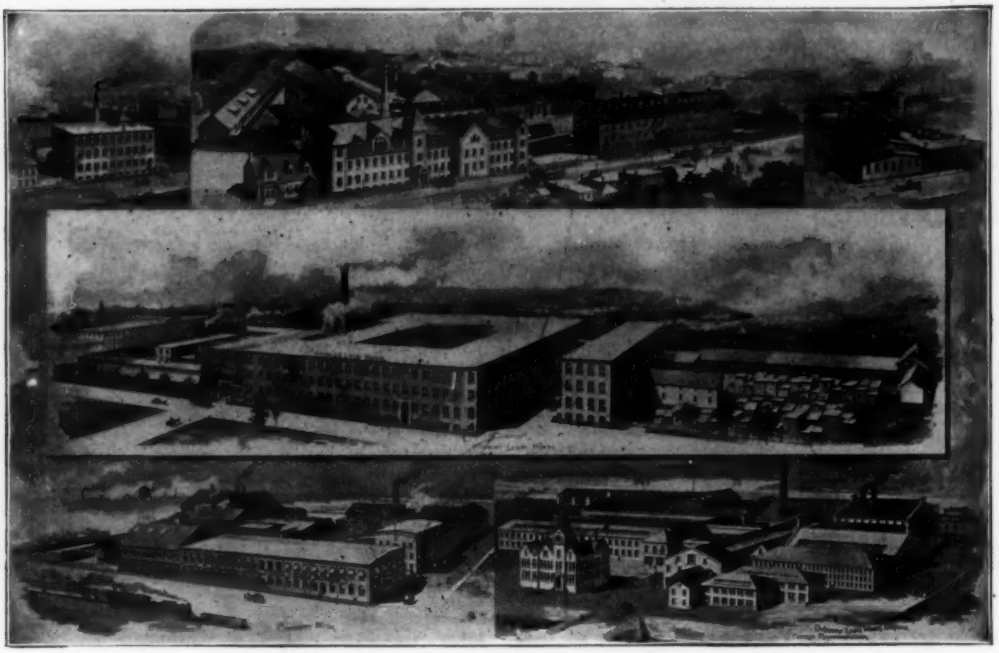

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COMBINING
The Textile World and Textile Record.

VOL. 26. (NEW SERIES.) OCTOBER, 1903 No. 1.

Monthly Comment.

Manila Hemp.

The London market for Manila hemp is threatened from a new quarter. We have already called attention to the effect of remitting the export tax on hemp shipped from the Philippines to the United States. This action has caused a marked increase in direct shipments and a decrease in shipments via London that promises to put an end to this branch of English trade. Heretofore the Continent has received its supplies of Manila hemp from London. Germany alone used annually from 40,000 to 50,000 bales, all of which paid tribute to England. In response to long continued and urgent appeals from German manufacturers of hemp goods, the Government has ordered a reduction of the freight rate on hemp from the principal German seaports to the hemp manufacturing districts in the interior. The hemp coming via London is transferred at the latter place to small vessels whose draft allows them to ascend the German rivers and deliver the cargo to the mills at a very low rate. The reduction in the rail rate, above referred to, makes the cost of transportation from Manila as low by German steamship and railroad lines as via London. The export tax levied in the Philippines on exports to all countries except the United States will keep Germany and England under the same disadvantage, and it is to be hoped will give America the control of the business.

Cotton Goods in the Philippines.

The cotton goods imported into the Philippines in May were valued at $396,057, and were classified as follows according to countries of origin:

Great Britain	51.23%
Spain	10.18
Switzerland	10.04
Germany	8.64
British E. I.	5.94
United States	4.84
Japan	4.00
France	1.75
Others	3.38

A New Textile School.

Some time ago we called attention to the plan to establish a textile school in connection with the Rhode Island School of Design, at Providence. This plan has been carried out and the course was opened with the new term beginning September 28. This is the first textile school to be established in Rhode

Island, one of the leading textile manufacturing states in the Union.

This textile course will extend over three years with two terms per year. The class work will be under the immediate direction of Herman O. Werner, a graduate of the Philadelphia Textile School. A supervising committee consisting of Henry F. Lippitt, Jesse H. Metcalf, Thomas B. Owen and Walter Burges Smith, will have general supervision of the work. Experienced instructors have been engaged and it is proposed to furnish the students with thorough instruction in designing and in the manufacture of textiles. No entrance examinations will be required although a knowledge of arithmetic up to and including percentage is regarded by the managers as essential.

The study of weave formation, analysis of fabrics, and textile calculations will form the basis of the first part of the course. Arrangements have been made to equip the textile department with the latest machinery and gradually the course will be developed under such conditions as will make it available for the large number of young men and women in Rhode Island who are desirous of training themselves for textile work.

Wages in the Textile Mills of Hungary.

The United States Consul at Prague sends an interesting letter to the State Department regarding the Hungarian textile mills, particularly those engaged in the manufacture of cotton goods. The official returns for 1902 give the number of spindles in the duomonarchy: Bohemia 1,750,000, Austria 1,378,000; total 3,128,000. Most of the production of the mills is on coarse counts, No. 30 and below, the finer counts are imported from England and Switzerland. The hours of labor vary from 10 1/2 to 11 1/2.

Wages paid to regular hands in the cotton mills vary from 3 to 5 crowns (61 cents to $1.02) per day, while the assistants receive proportionately smaller pay. The wages of the weavers are comparatively less; even in districts where the highest wages are paid they will hardly earn more than 3 crowns (61 cents) per day, while in the calico establishments in eastern Bohemia they get scarcely more than 2 crowns (41 cents) per day. In cases where a weaver serves four looms, or where particularly skilled hands are required —as, for instance, for jacquard looms, etc.— the pay is considerably higher. Those employed in the printing establishments form two distinct classes, viz., professionals— such as engravers, printers, etc.—who command even up to 10 crowns ($2.03) per day, and ordinary laborers, who get only 2 crowns (41 cents) or a trifle more.

The Cotton Crisis in Belgium.

Owing to the foresight in laying in a stock of cotton early in the season before the shortage became acute, the Belgian spinners have been among the last to close their mills because of a lack of the raw material. They have, however, been forced to take this action finally, and are now running but five days per week. The stoppage affects 10,000 looms. According to an investigation made by the Syndical normand de tissage de coton, 24,160 power looms in Normandy were running but five days per week during the month of August, and the working time has since been still further curtailed owing to the stock of cotton having become exhausted.

A Textile School Mill.

The tendency of technical schools toward the theoretical and away from the practical in manufacturing, has been recognized as a serious defect in this department of education. No matter how thorough may be the instruction nor how practical the instructor, the graduate leaves the school and enters the mill with many ideas that he must unlearn before he reaches the highest efficiency in the manufacture of commercial products. This defect is inherent in the very nature of things. If the most practical and hard headed of textile manufacturers should be induced to give up his business and take charge of a textile school, he would, doubtless, gradually drift toward theory and away from the practice that is essential to success in manufacturing yarn and cloth for market. The school in a large degree measures the success of the student by his ability to pass "exams," and it is

inevitable that the energies of both student and instructors should be directed toward reaching the school's standard of success.

Outside of the mill the question is a survival of the fittest. Every one in the business is in more or less direct competition with all the others. Success consists in supplying the consumer with the goods he wants at the lowest price and the largest profit. The workman must do his part in this struggle or change his boarding place. The mill owner must likewise do his part or go out of business. The requirements are inexorable. It is under such conditions only that operatives and owners reach the highest practical efficiency.

Educators have found it difficult to remedy this weakness of technical schools. Much has been done to overcome it and as far as possible the real work of manufacturing has been taken into the class room. Recognizing that in spite of all efforts this defect in technical education remains serious, the German government has boldly sought a solution by establishing a textile school mill at Aix-la-Chapelle, which is thus described by Dr. S. Kappf of that place:

The best opportunities for practical instruction are indisputably to be had in a mill or workshop where a business is actually being carried on according to business methods. Such a mill has been started in connection with the Prussian Higher Technical School for Textile Industries in Aix-la-Chapelle, with the sole object of providing such instruction for its pupils, and not for the purpose of serving as a source of income for the school; although, in order that the students may be made thoroughly familiar with the processes of manufacture and with business methods, from the raw material to the finished goods, the mill works on commission for establishments in Aix-la-Chapelle. The students number about 40, and power is supplied by a steam engine of 100 horse-power.

The method of instruction adopted in this technical school differs from that of others, in so far as the spinning, weaving, dyeing and finishing departments are each separate and self-contained. A student can therefore attend one branch only, or take any or all of the others in succession; and it will be seen that these separate branches correspond to the actual divisions of the textile industry. As a rule, manufacturers and managers will go through most, if not all, of the courses, and even to those students who wish to restrict themselves to weaving, a thorough knowledge of the after process of the finishing of fabrics will be found essential, especially in the manufacture of cloths. The course in each branch, with the exception of that in dyeing, extends over six months (including holidays): that is to say, five months of 44 hours per week, the terms commencing at the beginning of March and October. In the spinning, weaving, and finishing departments, only woolen is treated, whereas in the dyeing are included the entire processes of bleaching, dyeing and printing, of woolen, cotton and silk. A student desiring to learn spinning or finishing attends one course, but at the end of that time he can, if he wishes, continue the practical part a little longer, and attend the school as a practical student for periods of not less than a month. As regards weaving, this branch is too comprehensive for a six-months' instruction to prove sufficient for the acquirement of a good theoretical and practical knowledge; and, on this account, in addition to the real weaving course—which includes, besides plain weaving and cross-weaving, the dissection of patterns and a knowledge of the various materials, and of calculations for looms and other necessary machines—is a course for designing, in which the pupils are taught how to draw their own designs, execute their own patterns, and, in fact, to do original work. The student is, as a rule, recommended to take the course in the finishing of fabrics between the two courses just mentioned, for the reasons already given. An intimate acquaintance with factory laws and regulations, some knowledge of chemistry in relation to textile trades—as, for instance, purification of water, composition of soaps, oils, and colors—a general knowledge of boilers, steam engines, electrical installations and power transmission, and the ability to draw rough plans and sketches, is necessary to all engaged in the textile industry; and accordingly specialized instruction in the subjects above enumerated is therefore added to every separate course. A much longer period is given to the study of dyeing, this course extending over two years. The first year is devoted to chemistry and analysis, thereby imparting a sound fundamental knowledge absolutely essential to the second year's course, which comprises the whole scope of dyeing and technical analysis. In the present state of the dyestuff industry such knowledge is of course essential for anyone wishing to become a successful dyer; but any student already possessing sufficient knowledge in the subjects mentioned can enter at once in the second year's course or can take up the practical part by the month. Each department of the school is also open to occasional students who may attend lessons in one subject only. Moreover, in addi-

tion to the four schools already mentioned connected with this institution, there is a cloth-darning school for the women cloth-darners, and an evening and a Sunday school for the benefit of foremen.

This radical departure will be watched with interest and shows how thorough are German methods in technical education.

Labor and the Supply of Cotton.

The world is today face to face with a scarcity of one of the primary necessities, clothing. This is due to the shortage of cotton, the principal material in the manufacture of cloth. The shortage is not likely to become so great as to deprive any one of necessary clothing who has money with which to buy it, nor to raise the price of cotton cloth so high that wool and silk will become cotton substitutes, but the scarcity is real and not caused by a "corner" The daily consumption of cotton throughout the world has in recent years been about 40,000 bales. On the 12th of last month (September, 1903), the stock of visible cotton in the markets of the world was estimated at 400,000 bales of American and 600,000 bales of other grades. At the full rate of consumption this amount of American would supply the mills for ten days and become exhausted on the 22d of September. The stock of other grades of cotton would at the same rate last fifteen days longer and become exhausted on the 7th of the present month (October, 1903), leaving no cotton in sight except that supplied by the new crop.

This condition explains why the price of cotton is high and likely to remain so, why mills are stopping in every cotton manufacturing community on earth. The scarcity may not entail such hardship in certain localities as did the coal famine last winter, but in the aggregate the cotton shortage is far more serious. Anthracite coal is a primary necessity only in certain cold climates; cotton, on the other hand, is a necessity in all climates. The shortage of coal last winter was due wholly to the refusal of workmen to dig it out of the earth; the shortage of cotton is due in large measure to the inability to find laborers to cultivate and pick the crop.

The climate and soil of the South is as favorable as ever before for the raising of cotton, but the planters find it difficult to keep the number of negro workers up to the quota required to handle an average crop, and impossible to increase the number in order to raise a crop to meet the increased demand. Vast tracts of untilled land stretch out under a favoring climate, waiting only for the tiller of the soil to bring forth cotton for the idle looms of Krefeld, Moscow, Barcelona, Zurich, Bohemia, Charlotte, Lowell, Lancashire and along the River Po. They wait in vain, for the negro is slowly drifting away from the cotton fields to engage in pursuits offering steadier and more remunerative employment. The scarcity of cotton is due to a scarcity of labor, and until an increased supply of labor is obtained for the cotton plantations, the present preponderance of demand over supply is likely to be maintained.

The Remarkable Rise of the Italian Cotton Industry.

Thirty years ago practically no cotton goods were manufactured in Italy. During the next twenty years the industry was of but slight importance. For the past ten years it has grown with amazing rapidity and today Italian cotton goods are competing successfully with British goods in the markets of the Levant. The causes of this development bear a striking resemblance to those that have made our own South such an important factor in cotton manufacturing during the past twenty years. After lying dormant for centuries Italy, like the South, suddenly discovered that she possessed every facility for the successful manufacture of cotton goods.

An unfailing water power called "white coal" by the French, is obtained from the Italian rivers that are fed by the Alpine lakes. The rivers in Central and Southern Italy rising in the Apennines dry up or become very low during the summer months because the snow on these mountains disappears entirely early in the season. Not so, however, with the rivers of Northern Italy. The lofty summits of the Alps are encased in snow and ice the year round, and thus store an inexhaustible

supply of water that is released by the heat of the sun in all seasons of the year, more freely even in summer than in winter. This water from the Alps finds its way to the many Alpine lakes which serve as immense storage reservoirs. These lakes lie at various heights above the sea level, some being over a thousand feet deep and fifteen or twenty miles in length. The smaller ones send their surplus water into Lakes Maggiore, Como and Garda, from which it empties into the river Po. An inexhaustible supply of water is thus poured into the Italian rivers, supplying "white coal" with which to convert American cotton into cloth.

Great as is this advantage it would not alone have been sufficient to bring a great cotton industry into existence. Like our Southern States, Italy found she possessed along with cheap power a practically inexhaustible supply of cheap labor supplied by a teeming population bred to agricultural pursuits, and, although unskilled, yet willing to work long hours for low wages without a murmur of discontent. According to a recent official report there are at present 2,111,170 spindles and 78,306 looms in the Italian cotton mills, in which 135,198 persons were employed, divided as follows:

Men, 34,738.
Women, 82,932
Children under 15 years 17,528

Of the total number of operatives 12.3 per cent. were children under 15 years, as compared with 7 3/4 per cent. in our Northern mills and 25 per cent. under 16 years in our Southern mills.

Astonishingly low wages are paid. The average for the men is 41 cents; for the women 32 cents; and for the children 19 1/2 cents per day. Four-fifths of the cotton used comes from the United States, the other fifth from India and Egypt.

A striking feature of the Italian exhibit is the large number of operatives as compared with the machinery operated. 135,198 Italian hands run but 2,111,170 spindles, or 16 spindles per operative, while in our Southern mills 97,494 hands in 1900 operated 4,298,188 spindles or 44 spindles each, and in our Northern mills 200,435 hands operated 14,710,164 spindles, or 73 spindles each. This would indicate that Italy has a large supply of labor which is not only cheap but very poor. The cotton industry in Italy is but ten years old and capable of great development. With the natural advantages, low cost of living and large supply of cheap labor its continued growth is assured.

Free Trade in England.

The agitation in favor of a protective tariff in England is due to conditions that are well illustrated by the course of England's foreign trade in knit goods. According to a statement in a letter to Mr. Chamberlain by two prominent knit goods manufacturers, of Nottingham, Eng., the English exports of knit goods have decreased and the imports of the same goods have increased during the past 12 years at a rate that means the speedy annihilation of the English industry. The figures as given by these manufacturers are as follows:—

Exports of hosiery:

1890	$1,569,455
1903	260,555
Decrease 83%	$1,308,900

Imports of cotton hosiery:

1890	$2,051,150
1903	4,163,960
Increase 103%	$2,112,810

Imports of wool knit goods:

1890	$16,419,280
1903	21,374,410
Increase 30%	$ 4,955,130

Evidence equally strong is supplied by the trade in other lines of goods, some showing decided decrease in exports and increase in imports, other lines in which a stationary condition is scarcely less significant. The manufactured products of all kinds exported from England in 1902 (year ending June 30) reached a total of $1,417,699,900, and of this vast amount, $516,684,310, or 36% of the total, consisted of textile goods. It is no wonder that cold shivers run down the backs of our cousins across the sea when they see

this vast export trade in all kinds of textile products tottering ready for a fall. The exports of textile goods from England in 1901 and 1902 were as follows:—

	1901.	1902.
Cotton goods	$340,336,675	$331,212,570
All other	177,021,130	185,471,740
	$517,357,805	$516,684,310

The percentage of decrease (2 7-10) is small, but in the aggregate amounts to $9,-124,105. Cotton goods alone comprise 23% of the total exports from the British shores and with hosiery exports showing a decrease of 83% in 12 years or 7% per year, and cotton goods showing a decline of 2 7-10% in one year, the English people have good reason for alarm at the prospect before them. The present scarcity of American cotton is another menace to British trade, and added to this is the dimly defined, nerve racking dread of what is called "the American peril," which every thinking man, not only in England, but on the Continent expects to materialize when hard times return to the United States and force American manufacturers to unload their surplus on Europe at bargain prices.

These conditions are bringing a protectionist party into existence in free trade England, and it is these conditions that Americans can profitably study. The decline of British trade recalls a time, not very long ago, when under the Cleveland-Gorman-Wilson bill the industries of the United States lay prostrate, while an avalanche of foreign goods poured into the country. (See the accompanying tables of exports and imports for a series of years.) Very few of our readers are so young they cannot recall it, and now while England is passing through a similar period, it is well for us to realize that in a very large measure our present prosperity is due to the exclusion of cheap foreign goods from the country. Every manufacturing country on earth finds itself forced to adopt some modification of the American tariff policy. When we contemplate the prosperity that surrounds us we should all experience a deep feeling of gratitude to the great exponents of protection in the past, of whom Blaine and McKinley were the most conspicuous types.

EXPORTS AND IMPORTS OF MANUFACTURED WOOLENS.

Value in units of $100,000.

Year Ending June 30	Exports — Value.						Imports — Value.							
	Carpets.	Dress Goods.	Flannels and Blankets.	Apparel.	Other.	Total	Carpets.	Cloths.	Dress Goods.	Shawls.	Clothing	Knit Goods.	O her.	Total.
1890	.067	..	.409	3.179	.719	4.374	7.5	161.4	242.0	10.1	18.4	19.8	66.2	525.4
1891	.184	..	.265	4.240	.502	5.191	13.7	120.3	182.4	7.2	18.6	12.5	29.7	394.4
1892	.068	..	.244	2.689	.649	3.675	12.9	127.6	164.7	3.5	14.8	11.8	12.1	347.3
1893	.115	..	.242	2.224	.679	3.260	15.8	151.2	164.8	2.8	11.7	14.1	12.0	372.4
1894	2.500	..	.387	3.172	1.685	7.744	9.6	67.6	85.8	1.6	8.6	10.0	7.2	190.4
1895	1.610	..	.498	3.161	1.432	6.701	13.6	163.0	144.0	2.0	10.0	9.4	11.8	353.8
1896	2.252	..	.370	3.653	2.860	9.135	8.9	218.9	199.3	4.8	13.0	25.4	27.4	497.4
1897	1.895	..	.573	3.858	3.150	9.476	7.8	170.1	167.9	4.6	9.8	25.3	27.0	412.5
1898	1.612	.414	.474	4.290	4.074	10.89	17.9	39.6	60.4	.4	7.6	3.9	9.6	139.4
1899	.811	.169	.437	5.388	3.679	10.47	17.6	39.1	59.1	.5	8.3	6.3	5.6	136.5
1900	1.150	.244	1.002	5.654	4.485	12.54	27.5	51.3	58.7	.8	9.9	5.0	6.3	159.5
1901	1.051	.082	1.230	8.060	5.005	15.43	27.0	39.6	58.7	.8	11.7	4.1	5.3	142.2
1902	.867	.070	.883	8.521	4.780	15.12	34.4	48.0	64.0	.5	13.3	5.7	5.2	171.1
1903	.579	.044	.481	12.908	3.187	17.22	37.5	48.6	75.1	.5	19.2	6.7	4.7	195.4
July, 1903	.06	.003	.01	1.1	.3	1.47	3.0	7.3	9.0	.03	1.2	1.1	.6	22.23
Aug., 1903	.03	.01	.2	1.7	.4	2.34	3.3	5.1	7.7	.03	1.7	1.1	.7	19.73

Alpaca is the wooly hair of an animal of the camel tribe, inhabiting the mountainous districts of Chili, Peru and Bolivia. There are four species of these South American animals whose hair may be utilized for textile purposes, viz., the alpaca, the llama, the vicuna and the guanaco.

Remains of clothing made from alpaca have been found in the graves of the ancient Peruvians, and in the early part of the sixteenth century when Europeans first visited Peru, these animals formed the chief wealth of the natives, being the carriers of their commerce and the main source of their food and clothing.

EXPORTS AND IMPORTS OF MANUFACTURED COTTONS.

Value in units of $100,000.

Year Ending June 30	Exports — Value.					Imports — Value.							
	Colored.	Uncolored.	Apparel.	Other.	Total.	Colored.	Uncolored.	Apparel.	Laces, etc.	Thread.	Knit Goods.	Other.	Total.
1900	29	55	2	14	100	33.7	1.3	3.4	114.5	9	71.5	65.8	299.2
1901	26	93	3	15	137	42.4	1.7	12	106.9	8.6	67.4	59.2	297.2
1902	25	97	4	16	132	45	1.4	12.6	119.5	6.6	58.3	46.7	288.1
1903	28	63	5	22	118	55.4	2.6	16.8	127.4	7.6	63.9	61.8	335.5
1904	38	76	5	24	143	33.8	1	16.6	80.2	3.3	43.6	45	225.5
1905	35	70	5	28	138	54.3	1.2	27.7	116.9	6.6	65.4	59.9	332
1906	34	90	7	32	168	49.2	1.8	26.8	108.8	8.7	61.9	67.1	324.3
1907	48	125	9	29	211	44	2.7	26.3	125.7	6.5	56	83	344.2
1908	41	92	9	25	167	53.1	1.2	10.5	117.7	6.9	40.3	42.9	272.6
1909	52	138	15	30	235	66.5	1.1	10.3	145.5	8.5	43.4	45.8	320.6
1900	48	132	16	37	235	81.6	3.6	12.4	192.1	21	47.2	55.3	413.2
1901	66	76	17	33	192	59.2	2.0	15.3	202.3	17.5	55.0	51.4	402.7
1902	74	185	20	34	313	69.3	.9	16.5	224.5	19.2	53.6	60.4	444.4
1903	84	169	26	30	309	90.1	1.5	22.5	251.1	24.2	61.6	73.6	524.6
July, 1903	4	9	2	2	17	6.4	.1	1.8	20.2	1.7	4.8	7.6	42.6
Aug., 1903	5	4	2	2	13	5.9	.1	2.4	19.9	1.8	4.7	6.9	41.7

THE NEW SECRETARY OF THE NATIONAL WOOL MANUFACTURERS' ASSOCIATION.

The executive committee of the National Wool Manufacturers' Association has chosen John Bruce McPherson as secretary to fill the vacancy caused by the resignation of S. N. D. North. The new secretary of this association was born in Washington, D. C., Oct. 7, 1863. He was educated in the private schools of Gettysburg, and was graduated from Pennsylvania College at Gettysburg in the class of 1883. For several years he studied law in the office of J. C. Neely, in Gettysburg, and then, after a course in the Law School of the University of Pennsylvania, he received the degree of Bachelor of Law in 1888. From 1896 to the present time he has been engaged in the practice of law in Gettysburg with his brother, Donald P. McPherson, a graduate of the Harvard Law School and the State senator from the Thirty-second district of Pennsylvania.

Since 1894 he has been vice-president of the Gettysburg National Bank, and a trustee of Pennsylvania College since 1896. He has also been a director of the local gas and water companies. In 1899 he made an investigation for the United States Department of Labor of the workings of the Voluntary Boards of Conciliation and Arbitration in Great Britain, and his report was printed in the bulletin of the department for May, 1900.

FOREIGN SAMPLES.

The Bruenner Muster-Zeitung is a foreign sample journal, published in ten issues per year, of which five are for the Winter, and five for the Summer season. Samples of the latest European novelties in men's wear goods are furnished with each issue, together with particulars for manufacturing, lay-out, size of yarn, color pattern, weave draft, finish, etc. A key, by the aid of which the text is readily understood by readers of English, is supplied with each subscription.

This journal has been published for twenty-six years and numbers many American manufacturers among its subscribers. The publishers offer to supply upon request of subscribers samples of special fabrics which may not be included in the regular collection. The subscription price is $15.00 per year and a sample copy of the journal will be submitted to interested parties upon request to the Lord & Nagle Co., Boston, Mass., who will also continue to act as agents for Le Moniteur des Echantillons de l'Industrie Drapiere (Nova Texta).

The rice-growing industry of Louisiana and Texas has reached, during the last three years, enormous proportions, due largely to the introduction by the Department of Agriculture of a new Japanese variety of rice and to the operation of extensive and improved irrigation plants.

Seasonable Fabrics.

MEN'S WEAR WOOLENS.

The majority of the selling agents state that the business that has been done during the past month is satisfactory and fully up to expectations; buyers, however, have not bought with the same freedom as during past seasons. Conservatism has been the rule; on the other hand a larger number of buyers have visited the markets with the result that the volume of business aggregates a large total.

The most notable feature has been the demand for fabrics suitable for light overcoats and rain coats. The American Woolen Co. have produced a line of these goods particularly well suitable for such a purpose; the constituent parts are wool and mercerized cotton yarn. These fabrics come in ten, twelve and fourteen ounce weights; they are piece dyed; the Oxfords are dyed black and the tans are colored olive. The wool retains the dye while the mercerized yarn comes out in the original color. [Illustrations and analyses of these goods will be found in another part of this issue.—Ed.]

The clothiers have bought these fabrics in large quantities for ordinary light weight overcoats, and in the majority of cases they have them placed through the water-proofing process and frequently have them stamped "Priestly Cravenette."

The ten ounce goods are mostly used for women's wear. The American Woolen Co. state that the demand for goods of this character has been exceptionally heavy this season.

The bulk of the orders taken have been on fabrics at $1.50 and under. The market on the whole is in a healthy condition, although certain lines are admitted to be slow and heavy; fancy worsteds are now receiving better support. There is also an increased demand for heavy weight overcoatings, more particularly in the staple lines, fancy overcoatings in the heavy weight goods are not moving as well as the predictions made during early part of the season would warrant. The buyers have largely revised their orders and a number of cancellations have been received. Buyers also complain that the goods are not up to sample in point of quality, and considerable dissatisfaction has been heard as the result; quotations remain practically the same as those of last year. Prices are well maintained, and few concessions are being made.

DRESS GOODS.

The activity in women's woolen dress goods does not show any abatement; fancies at the present moment are in the lead. The demand for Scotch effects, which are shown in a large variety of styles and mixtures, continues good.

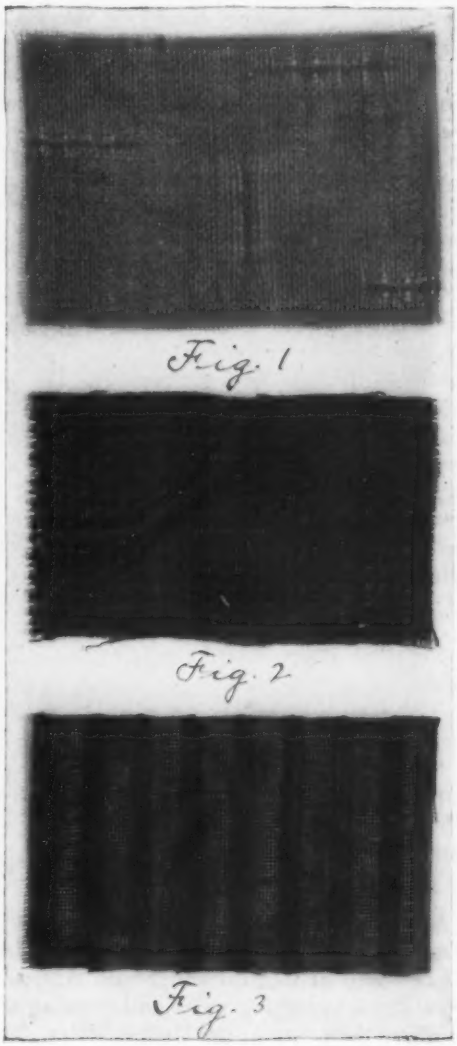
The higher grades of zibelines are in high favor with the houses catering to high class trade. The plain monotone close sheared goods as well as the shaggy variety are much in evidence and the handsomest costumes that are shown by the leading New York retailers are made of this fabric. These goods are certainly most desirable, and the imported costumes are extremely handsome. The fact that zibelines are fashionable for wraps as well as costumes, for plain, simple or severe tailored suits as well as the elaborate and dressy type, offers a broad scope for their usefulness.

The predictions made early in the season that zibelines would soon occupy second place has not been verified. The variety shown by the importers includes the long French nap monotones, illuminated boucle effects and mixed grounds, and all indications point to the popularity of this fabric among well dressed women.

Voiles continue in active demand for spring, also wool crepe de chine, etamines, prunellas and granites. Mohair voiles in all the delicate shadings and indefinite stripes and checks are an interesting line. Fig. 1 shows a mohair voile with noppe effect made by Schwartz of Chemnitz and imported by Skidmore and Muller.

Fig. 2 illustrates a spring fabric called plumetis batiste, and made of silk and wool. This is a soft, drapy fabric delightful to the touch and comes in all the beautiful shadings of the popular colors as well as black. Fig. 3

is a medium light weight fabric in narrow lace stripe and is destined to occupy a high place in the exclusive trade for spring wear. Fig. 4 is a fancy wool bourette in invisible checks illuminated in two shades of gray. Fig. 5 shows a soft fabric made of wool and



silk in two toned effect, possessing in a marked degree a softness of touch, combined with excellence of finish. Fig. 6 shows a light weight suiting made of twisted yarn in invisible gray checks.

The crepe poplins brought out by F. W. Corse are meeting with success. It has the quality of poplin with crepe surface. The demand for broadcloths, Venetians and covert cloths is reported satisfactory.

SILKS AND VELVETS.

Weakness characterizes the silk market, and the two auctions that have taken place emphasizes the fact that several of the mills are willing to unload at a sacrifice. This method of disposing of their surplus stock was satisfactory to the sellers, good prices having been realized, in many instances very close to the original list figures.

Fancies are gaining strength, elaborate designs are now being shown, while a month ago there were only small, neat effects. Several of the selling agents have been predicting that this would be the case, and are showing their confidence by the productions now shown. The demand for black broad silks are on the increase, both taffetas and peaus being used very extensively by the cutters up for waist purposes and silk coats. Jap silks are selling well and the call for pongees will strengthen as the season advances. Taffetas are in strong request and crepe de chines are meeting with popular favor as the principal fabric suitable for evening wear.

Gros grains are considerably talked about, but it is the general opinion that they will not reach a demand of any importance this season. Among the latest are the crystal and bayadere fancies—what success these will meet with remains to be seen. Entire taffeta gowns are being exhibited by several of the retail leaders and merchants generally seem to be making an effort to sell more entire silk costumes. There is no apparent reason why business in silk fabrics should be sagging; the fact is, however, that only about 50 per cent. of the looms in this country are now in operation, with the result that small manufacturers are becoming discouraged.

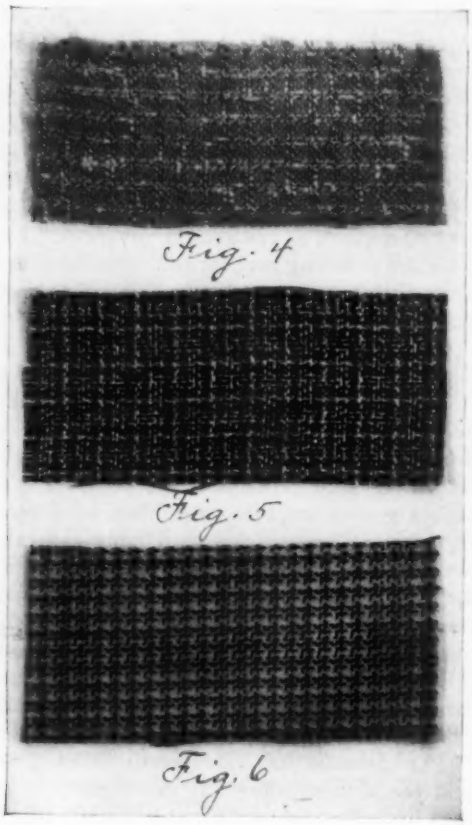
The demand for velvets continues good and the activity shown is satisfactory. Orders for velveteens are coming in quite freely, the call for fast black being a feature. These are now being made with a soft finish, and called chiffon velveteen. These are also used for bridal dresses in addition for their various other uses, and to a certain extent take the place of the traditional white satin.

Gun metal effects are maintaining their popularity both in extracted and hair line stripes.

Panne, mirror, paon and fancy velvets of all kinds are in evidence. Silk faced corduroy comes in the standard light and dark shades and is being sold for entire costumes as well as for waists.

COTTON WASH GOODS AND PRINTS.

Production has been very much curtailed with the consequence that stocks are very much depleted and many lines completely sold out. Confidence seems to be growing on the part of buyers, however, and disposition to operate more freely at present prices has been a feature of the present week. Agents feel more disposed to quote prices instead of booking orders at value.



Some concession in price is being made on 3 and 4 yard sheetings and a well known brand of bleached goods has been offered by a jobbing house at a reduction of 1/8 from previous quotation.

White goods and wash fabrics have been in fair request. Many of the importers are reporting good business as having been done for Spring. Some very handsome dresses in printed organdies and dimities are being shown and mercerized fabrics are selling freely. F. A. Bachman, selling through Oelbermann, Dommerich & Co., is showing an extensive line of mercerized vestings, the bulk of which is sold for shirt waist purposes. The prices on print cloth are held firm with a tendency towards an advance on black and whites.

The business booked for spring deliveries for low grade lawns, batistes and organdies has not been large, owing more particularly to the cautious policy pursued by the printers.

Chambrays and goods on that order have met with material success, reorders now coming in quite freely. Ginghams are selling in a satisfactory manner, the higher grades having the strongest call. The demand for flannelettes and percales is only limited.

LININGS.

No particular development has taken place in the lining end of the business. Prices are well maintained. The principal call is for the mercerized finished goods.

Mohair serges and Italian twills are in fair request with silesias and percalines slow. Price on kid finished cambrics has been advanced to 3 7/8.

Agave is the botanical name for a large genus of fleshy leaved plants found chiefly in Mexico and in Central and South America, a few species creeping up to and crossing the Southern boundary of the United States. The best known species is the century plant, or American Aloe, first introduced from Mexico into Europe in 1561. The leaves of nearly all the numerous species of agave furnish a valuable commercial fibre, which is made into thread and ropes and has been used in the manufacture of paper.

FANCY PIECE DYED UNION SUITINGS.

The cotton, worsted and carded woolen suitings made by the American Woolen Company have proved good sellers, and doubtless our readers will be interested in a description

Fig. 3

Fig. 4

of these fabrics. The style shown at Fig. 1 is sold for $1.00 per yard 6/4. The warp consists of 3,060 ends of double and twist, the twist being a No. 18 single cotton with a No. 24 single worsted, 14 turns to the right. The cotton thread appears to be a combed peeler and has been slightly tinged in piece dyeing the wool. As it is necessary for the mixed effect to be uniform, it is best to use a combed yarn. On account of the tinge referred to it is difficult to say whether this yarn was bleached or not. The twist effect shown in the illustration is very regular. A worsted thread is used because it would be difficult, if not impossible, to obtain a uniform carded woolen thread as fine as is required, 8.4 runs. The worsted thread is not only more uniform, giving a more regular twist, but is cheaper than a woolen yarn of this size would be.

The sample which we analyzed weighs 12.3 ounces per yard 55 inches wide. The fabric has the appearance of having been fulled very little, if at all; the slight felt in it may have resulted from the scouring and dyeing processes, and we estimate the loom width at 66 inches. The goods are woven with a three-leaf filling twill, which throws the woolen filling on the face and the cotton and worsted twist warp on the back, increasing the woolly effect of the face. The cloth is woven with 44 picks of 4.6 carded woolen filling. This filling appears to be made of a fine medium wool mixed with waste. It would not be practicable to use more than 40 per cent. of waste in the filling for this fabric, on account of the danger of tender goods. The sample analyzed is very strong. Where cotton and worsted twist is used in the filling the strength would be greatly increased and the danger of tender goods eliminated.

We have estimated the cost of this fabric, assuming that the cotton is combed peeler yarn costing 33 cents per pound, the worsted yarn to cost $1.00 per pound, and the filling made of a mixture of 60 per cent. of wool at 50 cents per pound and 40 per cent. of waste at 20 cents per pound, average cost of the filling stock at the picker, 38 cents. As the cost of the raw material includes the yarn spun for warp, the labor item in our estimate covers the labor and expense of spinning the woolen filling and not the cotton and worsted warp. Our estimate is as follows:

Cost per yard:	
Stock	.526
Labor	.206
Expense	.092
Total	.824

This estimate is based on one loom to a weaver. Assuming that the discount and selling expenses amount to 16 per cent. we calculate the net amount received for the goods per yard as follows:

Fig. 1

Fig. 2

Selling price	$1.00
16 % off	.16
Net yield to the mill	$ .84

This is but 1 1/2 cents more than the calculated cost, but economies in the large selling organization may increase the margin. The dollar fabric is made in various styles and colors. Fig. 2 shows another style which is made in black and white, brown and white, olive and white.

Fig. 3 is another fabric of the same general character selling for $1.12 1/2 per yard 6/4. The difference between this fabric and the one already described consists mainly in the weight of the goods, the fabric at Fig. 3 weighing 13.2 ounces per yard 55 inches wide. This increase in weight is obtained by putting in two more picks and spinning the filling to 4 instead of 4.6 runs. The cotton and worsted yarns are of the same size as in the dollar goods. The color, fabric and finish being in other respects practically the same. The weave is a four-leaf twill and as a consequence the heavier fabric with a looser weave, gives a cloth slightly slazier than the dollar cloth, which is lighter, but woven with a three-leaf twill.

Fig. 4 shows still another variation of this fabric. The difference consists in the size of the cotton worsted twist; the single cotton is about a No. 50. The worsted is made heavier, being a No. 16 single, in order to make the resulting size of the twist the same as in the other styles of this fabric. In the sample illustrated at Fig. 4 the warp is all twist, the filling carded woolen yarn, the latter being spun to about 4-run. The weave is three-leaf warp twill, throwing the worsted and cotton twist on the face and the woolen filling on the back. As the cotton yarn is much finer than that shown at Fig. 1 the twist effect is less pronounced in spite of the warp weave.

The goods are very attractive and have every appearance of being wool dyed until the threads are closely examined. Their piece dyed character is then disclosed by two conditions: the cotton warp is slightly tinted and in some patterns the dye has not penetrated the woolen yarn to the center, which has a gray appearance. As the woolen filling is spun and woven in the gray, shorter and cheaper material can be used than would be possible if the stock were colored in the raw state. The weaving of the goods is not likely to present any great difficulties as the twist and the woolen yarn would be so different in appearance, there would be no

danger of getting the yarns mixed in weaving. The cloth should be easy to finish because of its mixed color. The goods are made in brown and black as well as white and black.

The chief objection to the fabric is the low margin of profit, but our designers and manufacturers may have sufficient ingenuity to overcome this objection by successful manipulation of the stock and alteration of the structure of the goods.

son. The weave is a five-leaf steep warp twill which brings the warp on the face. The analysis results as follows:

Weight, 15 1/10 ozs. per yard, 55 inches wide;

Warp, 1/23 worsted, Twist, 1/73 cotton, 102 threads per inch;

Filling, 1/16 worsted, 68 threads per inch.

It should be borne in mind that this analysis gives the structure of the finished fabric, and to obtain the size of the spun yarn allow-

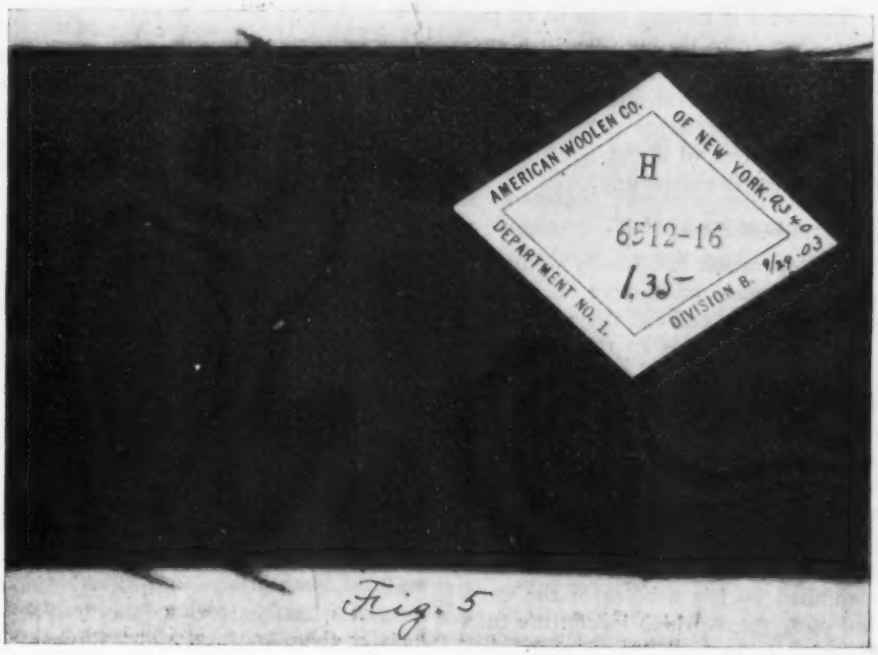


Fig. 5

Still another fabric made by the same company and belonging to the same class of goods is shown at Fig. 5. This fabric is heavier than the others, weighing 15.1 ounces per yard, 55 inches wide. The warp is all cotton and worsted twist, the filling is single worsted instead of wool as in the other samples. The cloth is set closer and has a much finer appearance. It is a very attractive fabric and is well suited for a light weight overcoating. A short nap is left on the face so as to give the goods a wooly effect, and the back has evidently been napped for the same reaance must be made for shrinkage and take-up. The finished cloth contains 10 per cent. of cotton.

The first factories for the manufacture of silk ribbons in the United States were established in New Jersey and in the neighborhood of New York City, about forty years ago.

The first power loom built in this country for weaving broad silks was made by William Ryle of Paterson, N. J., 1842.

French Worsted Spinning.

III.

BY A FRENCH TEXTILE ENGINEER.

(Copyright, 1903, by Lord & Nagle Co.)

DRYING THE WOOL.

The third operation is drying the wool which, after having been scoured and rinsed, has been freed by the squeeze rolls from the greater part of the water absorbed during rinsing. The wool is usually dried in an immense revolving drum through which a current of hot air is passed. The wool is alternately raised about six feet and then let fall. This is repeated about twenty times, with the result that at the end of about five minutes the drying process is complete.

OILING THE WOOL.

The fourth operation consists in adding to the wool a small amount of olive oil, from 2 to 5 per cent of the weight of the wool. The object of this operation is to restore to the wool fibre a slight degree of the natural oiliness which has been removed too thoroughly by the process of scouring. The olive oil renders the wool more pliable and slippery, and prevents a breakage of the fibres in the subsequent processes, particularly those of carding and drawing through the porcupines. In these processes the wool in the form of tufts is combed by the needles of the card, comb and porcupines, which loosen the tufts and lay the fibres parallel. If properly oiled the fibres slip on each other and on the needles without breaking.

The wool, having lost a large part of its original weight, varying according to the grade from 20 to 80 per cent., is clean, white as snow and without odor, is now ready for carding.

CARDING.

The object of carding is to separate the fibres of the wool from each other. As the wool comes from the scouring process it is in the form of locks or bunches, varying from the size of a snowflake to that of a hen's egg. At times it gets into a rope form from which it seems at first impossible to separate it without breaking a large number of the fibres. The longer and finer the fibres, the more difficult is the work of separation.

The second object in carding, no less important than the first, is to remove the burrs, both the hard and the soft spiral variety, from the wool. The first are the black, prickly burrs shaped like an almond, and as hard as if they were made of wood. The second are smaller, somewhat softer, covered with sharp points, and in reality are composed of a vegetable filament about two inches long, wound in spiral form. Unfortunately this filament during its passage through the card, is unwound by the action of the clothing, broken up into fine particles and mixed intimately with the wool fibres, making their removal very difficult in the subsequent processes. They depreciate the value of the material and the only mechanical process that will remove them is that of combing.

The carding process breaks up the felted locks of wool and separates the fibres completely. The carded web as it comes from the machine should be transparent and free from ribs, flakes and bunches; it should be uniform in thickness and not show any difference in shade owing to one part being heavier than another. The card should remove all round burrs and the greater part of the spiral burrs. Unfortunately no carding machine has yet been built that will remove all the spiral burrs, consequently the carded wool always contains more or less of this vegetable matter which has been split up by the carding process.

DRAWING AND COMBING.

The wool comes from the card in the form of a regular homogeneous ribbon or sliver, weighing about 140 grains per yard. The fibres, instead of being parallel, lie across each other at various angles, and most of them are more or less curled. It would be inexpedient to comb the stock in this form,

as it would increase greatly the percentage of noil. For example, wool which ordinarily yields 10 per cent. of noil at the comb, would yield 16 per cent. of noil if the stock was taken direct from the card to the comb without first running it through gill boxes. It is necessary, therefore, to reduce the quantity of noil by passing the stock several times through gill boxes, which bring the fibres nearly to a parallel position. Three passages are generally sufficient. The draft of each box is about 7 1/2; three boxes therefore give a draft of $7.5 \times 7.5 \times 7.5 = 420$, or approximately 400. If the wool is drawn less than this the noil will be increased. For example, passing through three boxes, each with a draft of 5 and a total draft of 125, would not be sufficient. If the draft of each box is reduced the number of draw boxes should be increased in order to retain the total draft of approximately 400. There is no advantage in increasing the number of gilling operations and reducing the draft. In the great majority of modern combing mills three draw boxes of a draft of 7.5 each are used. This work is well done by gill boxes and still better by what is called an intersecting. The porcupine frames or draw boxes are not suitable for working a heavy sliver by reason of the great resistance it offers to the drawing rolls and consequent danger of breaking the fibres. Passing through the three gill boxes the wool goes to the comb. Combing is one of the most important operations in the whole process of manufacturing and effects a decisive and definite transformation in the form of the material.

COMBING.

Combing has two distinct objects which are equally important. First, to separate all impurities from the wool which have not been removed by previous processes. These impurities consist of small particles of vegetable matter nearly as fine as the wool fibre themselves. These particles are the result of the action of the card on the burrs in the wool. In addition the wool contains a large number of minute specks composed of vegetable matter, being the debris from the vegetable material. There is also, especially in Australian wool, a quantity of wool nibs or specks, which are formed by the wool fibres becoming felted or knotted in such a form that the card cannot loosen them. These wool nibs are very difficult to remove and there are but two systems of combing that will remove them completely without causing an excess of noil.

The second object of combing is to separate the fibres of a certain length from those that are longer. As we have already learned, wool is composed of fibres varying widely in length from zero to the maximum, the latter being called the length of the wool, although in reality it is the length of but very few of the fibres. This separation of the wool fibres under certain length (generally 3/4 of an inch) can be well done only with a Heilmann comb having an alternating motion, and not with the round combs like the Noble, Lister or Holden. Circular combs are excluded from the French system of worsted manufacturing. The most important machines for combing French worsted are the comb invented by Charles Gegauff, built by the Societe Alsacienne de Constructions Mecaniques, Mulhouse, Germany; the comb invented by M. Dellette, built by A. Gruen, Lure, France, and the comb built by Schlumberger & Co., Gebweiler, Alsace. These three combs, especially the first, separate the short fibres and also clean the stock perfectly, with a maximum of noil varying from 1 to 3 per cent. from medium, and from 12 to 20 per cent. from very fine wool. The production of a comb varies from 130 to 300 lbs. per day of ten hours, according as the quality is fine and short, or coarse and long. Burrs and specks are removed completely by these machines which are adapted for handling long fibres up to 12 inches in length.

The noil consists of the fibres under 3/4 of an inch in length and the vegetable impurities found in the wool. As a consequence the noil is a dirty gray color while the combed top is white. The noil is sold for other uses in manufacturing and is not used in the worsted mill.

CAN DRAW BOXES.

The wool comes from the comb in the form of a regular sliver in which, however, can be seen traces of the different qualities and lengths of wool. It is, therefore, indispensable to double a number of these slivers and then draw them out, in order to remove the

inequalities caused by the imperfect blending of the fibres. The draw boxes with porcupine rollers are the best for this purpose. The gill box cannot be used to advantage for this work, because the fallers as they are suddenly lifted up in order to drive the pins into the sliver, are likely to increase instead of diminishing the irregularity in the sliver, especially when the points of the needles are blunt. In the latter case, the needles instead of entering the sliver lift it up, and thus easily aggravate the irregularities it was intended to remove.

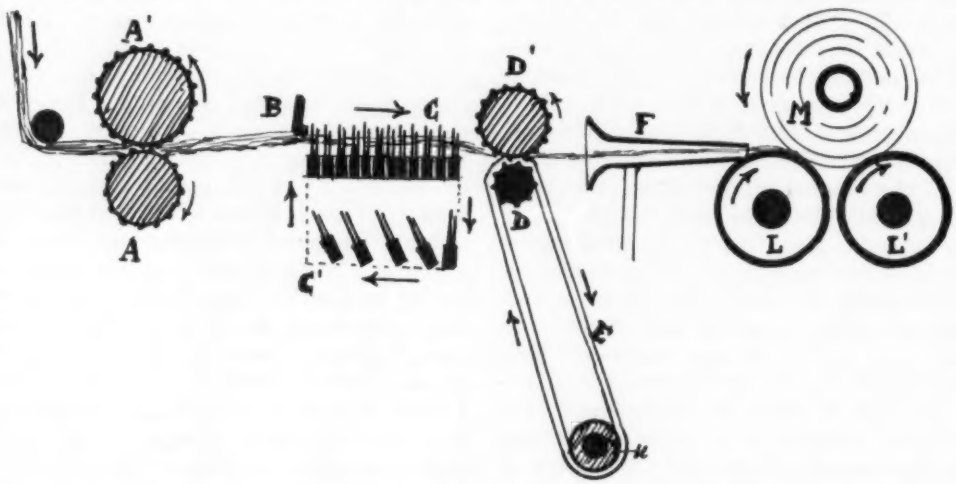


FIG. 13.

BACK WASHING.

The object of back washing is to remove the oil that was applied to the wool after it was dried. This oil is necessary in order to facilitate the operation of carding; without it many of the fibres would be broken. The oil also facilitates the operations of drawing and combing by causing the fibres to slip on each other more easily, thus preventing breakage of the wool. This is not the case in the processes which succeed combing. It often happens that wool, after it is combed, is placed in storage where it remains sometimes for months before it is drawn and spun into yarn. If the oil is left in the wool during this time it is likely to become rancid, tendering the fibre and making the dyeing process more difficult. Another important object of back washing is to straighten the fibres and counteract the natural tendency to curl. This tendency to curl makes it more difficult to draw and spin the yarn properly, and makes the thread fuzzier and less brilliant.

Back washing consists in passing the slivers of wool through two successive baths of hot soap solution at a temperature of 40 to 45 deg. C., which dissolves the olive oil on the fibre. After coming from the last bath the slivers pass successively over ten drums, heated to 110 deg. C. by steam pressure. This dries the wool and straightens out the fibres, and makes the sliver more lustrous. Another advantage of back washing is to make the wool more capable of absorbing moisture. It is very important to have the wool moist during the drawing and spinning operations. This object is attained by artificial moistening of the air in the work rooms. If the oil is not removed from the wool the fibres cannot absorb this moisture and consequently the work is injured; the thread will be fuzzier and drier, and take less twist when spun. These are the principal reasons for back washing.

The back washer is provided with a draw box, usually a gill box, in order to economize time by combining the two operations. The gill box is preferred to the porcupine box because the latter is not suited for handling heavy slivers, which in this case are very wet and as a consequence offer still greater resistance to the drawing rolls. The gill box on

the contrary, while holding the wool in a great number of needles, does not subject it to so much strain during drawing. This is due to two causes: First, because the needles holding the wool are not inclined backwards, but stand horizontally to the wool fibres; second, because the sliver is drawn in a straight line while with the porcupine rolls it is curved. In this curved position the strain of the fibres is much greater because of the pressure of the wool against the needle cylinder.

DRAWING AFTER BACK WASHING.

After back washing the wool is passed through a draw box, Fig. 13. The gill box is also preferred here for the reason before given. The intersecting is not used because it is more expensive than the gill box and more delicate. The gill box does nearly as good work as the intersecting, although the latter occupies the first rank among drawing machines. The draft of this drawing box varies from 5 to 8. After this operation the wool is usually put in storage. Here it remains till required for filling orders. It often happens that the combed wool will remain undisturbed for a year or more. When taken out the material is put through the last nine operations which make it ready for spinning. These nine operations are termed in Europe, preparation or preparatory processes. Each is a simple drawing process and nothing else, the object being to make the roving uniform by successive doubling and drawing, each operation making the roving finer until it is fine enough for spinning.

It may seem to the inexperienced that such a number of repetitions of the same operation is unnecessary, but the contrary has been proved by experience. The sole object is to remove irregularities by a large number of doublings and drawings. At each operation four or five ribbons or slivers are passed side by side into the draw boxes. This drawing, unfortunately, causes new irregularities in the thickness of the ribbon. This is because the draft of a perfectly uniform sliver produces inequalities in the resulting strand. It is not sufficient, therefore, to draw the single sliver without doubling several together. Drawing without doubling would result in a yarn full of twits, lumps and other irregularities. It would evidently be a great economy, if feasible, because it would then be necessary simply to draw the single sliver to the size required for spinning. The doubling is necessary because of the mixture of fibres of different lengths.

These fibres are irregularly distributed throughout the sliver and the short fibres are collected in isolated bunches, passing in this form without great change through the various processes of drawing. The drawing rolls operate only on the fibres whose length is greater than the distance between the two sets of rollers. Such fibres are held by the delivery rolls for some time after the other end of the wool has been seized by the drawing rollers. The short fibres collected in bunches are pulled forward by the long fibres as the latter are drawn forward by the rollers. The irregularities thus caused are equalized by doubling a number of slivers in each succeeding process until the final spinning process is reached. Unfortunately the inequalities from this cause in the spinning process cannot be removed by any subsequent operation. This defect in spinning can be proved by spinning a black and a white roving together. The yarn thus obtained will show pronounced irregularities as illustrated at Fig. 14. The fine places are indicated by the increased abount of twist at (a a), while the few turns at (b b) show that here the yarn is coarser. This test shows that the twist in spun yarn is very irregular. Fig. 14 is not exaggerated at all; frequently within the space of a few inches twice as many turns of twist can be found in one part of the thread as in another. This will be a matter of sur-

FIG. 14.

(To be continued.)

The 75th Semi-Annual Meeting of the New England Cotton Manufacturers' Association.

The wisdom of the board of Governors of the New England Cotton Manufacturers' Association in selecting Hotel Aspinwall of Lenox, Mass., as the place of holding the Fall meeting of the Association, was made very apparent and will be entered on the proceedings of the Association as one of the most enjoyable, both from an intellectual and social standpoint. The sessions during the convention were full of interest and the papers read there were received with much interest and enthusiasm. The many attractions of this beautiful hotel and the beauties of the surrounding country rendered it perfectly desirable and the social features which were enjoyed not only by the ladies in the party, but by many members, helped much to make this meeting one of the most pleasant ever held.

A portion of one of these meetings was composed of a musical entertainment by some of the members which was voted a great success. Transportation matters and hotel accommodations were under the direction of Messrs. Raymond and Whitcomb, well known tourist agents, and that fact alone was a guarantee of smoothness of all arrangements.

The party, numbering about a hundred and fifty, left the South Terminal Station, Boston, on a special train with drawing room cars at 1 p. m. Tuesday, stopping to take on passengers en route at Worcester and Springfield. Arrived at Pittsfield about 6.15 p. m. Shortly after the entire party were driven to the Hotel Aspinwall on special barges and tallyhos, arriving there about one hour later. The drive by moonlight in the crisp autumn night was greatly enjoyed by the entire party. Owing to the lateness of the arrival at the hotel, there was no meeting or entertainment the first evening. At the hotel the party was joined by the contingents from New York City and Western New York, which swelled the total attendance close to two hundred fifty.

The first session was held Wednesday morning at nine o'clock in the music room and the address of welcome was delivered by the Hon. William B. Plunket of Adams, Mass. The meetings were presided over by the president, Herbert E. Walmsley, of New Bedford, Mass., and Mr. C. J. H. Woodbury, the very efficient secretary of the organization.

During the session of the Convention, the following resolution was presented and adopted:

Whereas, The normal output of American cotton mills now exceeds the domestic demand and is increasing more rapidly than the latter, resulting in a constantly growing surplus that must either be exported or thrown upon the home market under conditions that may result in serious price disturbance and loss; and

Whereas, Foreign markets are at present taking a considerable portion of this surplus and are capable of taking much larger quantities if properly developed, and

Whereas, The American consuls are at present doing excellent service in reporting upon the conditions and opportunities that exist abroad in other leading lines and are in a position to secure much valuable information on the subject of export markets for American cotton goods, therefore,

Be it Resolved, That the Secretary of this Association be requested to communicate with the Department of Commerce and Labor and, if necessary, with the Department of State to the end that suitable instructions may be issued to the consular officials of the United States in all foreign countries requesting them to secure all the available information regarding the possible markets for American cotton goods of all descriptions, including yarns, that may exist in their respective districts, together with such samples, price lists and other material as may be of practical utility to the members of this Association.

The following amendment to the Constitution and By-Laws was also adopted:

In accordance with the notice given at the 74th meeting the following amendment is submitted in accordance with Article 15 of the Constitution and By-Laws, namely,—

"Article 5. Any active or associate member by the single payment of one hundred dollars shall be exempt from all future payments for dues and shall become a life member having all the privileges of active members.

"All moneys thus paid shall be invested as a permanent fund by the Treasurer acting under the direction of the Board of Government, of which

the income only shall be subject to appropriation for current expenses.

"All articles of the Constitution and By-Laws, beginning with Article 5, shall be increased in number to the next cardinal number."

In accordance with the Constitution and By-Laws the above will require the assent of two-thirds of the members present and voting thereon for its adoption.

On Thursday afternoon about a hundred and fifty members and guests accepted the invitation of the Stanley Electric Mfg. Co. of Pittsfield to visit their immense works, and found that a visit of much pleasure and interest.

The following is a list of the members and guests:—

In Charge: Carroll Hutchins, Charles A. Cooke. In Charge Baggage: Chester W. Smith. Edw. Atkinson, Stoddard, Haserick, Richards & Co., Boston, Mass.; Edward Atkinson, Boston, Mass.; H. C. Atwood, Killingly, Conn.; Mrs. H. C. Atwood, Killingly, Conn.; George A. Ayer, Easthampton, Mass.; Mrs. George A. Ayer, Easthampton, Mass.; G. B. Ballagh, Textile Manufacturers' Journal, Boston, Mass.; H. J. Ballou, John Hetherington & Sons Co., Ltd., Jamaica Plain, Mass.; Mrs. H. J. Ballou, Jamaica Plain, Mass.; Mrs. Gertrude Child Barrows, Providence, R. I.; L. E. Barnes, Lawrence, Mass.; Mrs. L. E. Barnes, Lawrence, Mass.; D. M. Bates, Belmont, Mass.; Mrs. D. M. Bates, Belmont, Mass.; A. C. Bent, Mason Machine Works, Taunton, Mass.; Howard W. Bible, American Knit Goods Review, New York, N. Y.; Mrs. Howard W. Bible, New York, N. Y.; E. E. Blake, Newton Highlands, Mass.; Mrs. E. E. Blake, Newton Highlands, Mass.; Warren Breed, Lynn, Mass.; Mrs. Warren Breed, Lynn, Mass.; H. G. Brinckerhoff, Green Economizer, Boston, Mass.; Mrs. H. G. Brinckerhoff, Boston, Mass.; Charles B. Burleigh, Malden, Mass.; Mrs. Charles B. Burleigh, Malden, Mass.; A. C. Butler, Boston, Mass.; Arthur O. Buzzell, Macrodi Fibre Co., Woonsocket, R. I.; M. Campbell, Woonsocket Mch. & Press Co., Woonsocket, R. I.; Frank Champlain, Warren, R. I.; Charles H. Child, Providence, R. I.; Joseph B. Child, Providence, R. I.; Miss Alice M. Collins, Berkeley, R. I.; Charles H. Collins, Berkeley, R. I.; Mrs. Charles H. Collins, Berkeley, R. I.; F. B. Comins, American Moistening Co., Boston, Mass.; John J. Connell, Lowell, Mass.; Mrs. John J. Connell, Lowell, Mass.; J. A. Cooper, Whitin Machine Works, Whitinsville, Mass.; T. G. Cox, Taunton, Mass.; Mrs. F. W. Crocker, Malden, Mass.; Edward P. Dennis, Lowell, Mass.; Miss Bertha Denny, Leicester, Mass.; Charles A. Denny, Leicester, Mass.; Henry Dexter, Green & Daniels Mfg. Co., Pawtucket, R. I.; Austin R. Dodge, Schenectady, N. Y.; Miss Louise B. Dodge, Schenectady, N. Y.; C. E. W. Dow, American Moistening Co., Dorchester, Mass.; Fred Easton, Easton & Burnham Mch. Co., Pawtucket, R. I.; G. B. Emmons, Mills & Emmons, Lawrence, Mass.; J. H. English, English-Green Co., Providence, R. I.; Mrs. J. H. English, Providence, R. I.; William Evans, Fall River, Mass.; Mrs. William Evans, Fall River, Mass.; H. P. Garland, Garland Mfg. Co., Saco, Me.; Mrs. H. P. Garland, Saco, Me.; Dr. George W. Gay, Chestnut Hill, Mass.; Rufus B. Goff, Providence, R. I.; A. M. Goodale, Boston, Mass.; George P. Grant, Jr., Grant Yarn Co., Fitchburg, Mass.; Mrs. George P. Grant, Jr., Fitchburg, Mass.; D. W. Gray, Skenandout Cotton Co., Utica, N. Y.; John Gregson, Fiskdale, Mass.; Mrs. John Gregson, Fiskdale, Mass.; A. H. Gulliver, Waltham, Mass.; T. F. Havey, H. G. McKerrow Co., Boston, Mass.; C. C. Hedrich, Lowell, Mass.; A. H. Howard, Howard Bros., Worcester, Mass.; Mrs. A. H. Howard, Worcester, Mass.; F. W. Howe, Providence, R. I.; J. B. Jamieson, Boston, Mass.; Leonard Johnson, Fall River, Mass.; Mrs. Leonard Johnson, Fall River, Mass.; F. B. Kenney, T. C. Entwistle Co., Lowell, Mass.; Mrs. F. B. Kenney, Lowell, Mass.; Miss Marion E. Kerr, New Bedford, Mass.; N. B. Kerr, New Bedford, Mass.; Mrs. N. B. Kerr, New Bedford, Mass.; W. H. Langshaw, New Bedford, Mass.; Mrs. W. H. Langshaw, New Bedford, Mass.; W. H. Loftus, Newark, N. J.; Mrs. W. H. Loftus, Newark, N. J.; Arthur H. Lowe, Fitchburg, Mass.; Mrs. Arthur H. Lowe, Fitchburg, Mass.; Russell B. Lowe, Fitchburg, Mass.; S. C. Lowe, John Hetherington & Sons Co., Ltd., West Newton, Mass.; Mrs. S. C. Lowe, West Newton, Mass.; Frederick B. Macy, New Bedford, Mass.; Mrs. Frederick B. Macy, New Bedford, Mass.; Charles T. Main, Winchester, Mass.; Mrs. Charles T. Main, Winchester, Mass.; Miss Alice McCullough, New Bedford, Mass.; John McCullough, New Bedford, Mass.; Joseph Merriam, Windsor Locks, Conn.; Mrs. Joseph Merriam, Windsor Locks, Conn.; A. B. Mole, Montreal, P. Q.; Mrs. A. B. Mole, Montreal, P. Q.; J. R. Montgomery, J. R. Montgomery & Co., Windsor Locks, Conn.; Mrs. J. R. Montgomery, Windsor Locks, Conn.; Mrs. A. V. Moulton, Providence, R. I.; Frank L. Nagle, Textile World Record, Boston, Mass.; W. P. Nairn, Emmons Loom Harness Co., Lawrence, Mass.; A. W. Noone, Peterboro, N. H.; W. R. Noone, W. R. Noone & Co., Boston, Mass.; S. B. Paine, Newton Highlands, Mass.; H. C. Perham, Kitson Machine Works, Lowell, Mass.; Mrs. H. C. Perham, Lowell, Mass.; Amasa Pratt, Lowell, Mass.; Mrs. Amasa Pratt, Lowell, Mass.; Mrs. H. A. Priest, Auburndale, Mass.; Arthur S. Salomon, Lowell, Mass.; W. N. Shaw, New York, N. Y.; Mrs. W. N. Shaw, New York, N. Y.; Miss Bertha Sheldon, Providence, R. I.; F. P. Sheldon, Providence, R. I.; Mrs. F. P. Sheldon, Providence, R. I.; A. P. Smith, New Bedford, Mass.; Harry M. Smith, Providence, R. I.; Mrs. Harry M. Smith, Providence, R. I.; J. C. Smith, Fall River, Mass.; Mrs. J. C. Smith, Fall River, Mass.; Henry B. Sprague, Lynn, Mass.; Mrs. Henry B. Sprague, Lynn, Mass.; James Strang, Indian Orchard, Mass.; Miss Helen F. Thompson, West Somerville, Mass.; J. T. Thornton, Thornton Mch. Co., Providence, R. I.; Mrs. J. T. Thornton, Providence, R. I.; R. W. Thurston, A. G. Thurston & Son, Fall River, Mass.; Mrs. R. W. Thurston, Fall River, Mass.; J. P. Tolman, Boston, Mass.; A. W. Trafford, Fall River, Mass.; Mrs. A. W. Trafford, Fall River, Mass.; Robert B. Treat, Providence, R. I.; Mrs. Robert B. Treat, Providence, R. I.; O. B. Truesdell, Newtonville, Mass.; C. A. Wakefield, Biddeford, Me.; Miss Beatrice Walmsley, New

Bedford, Mass.; Herbert E. Walmsley, New Bedford, Mass.; Master Herbert Walmsley, New Bedford, Mass.; Miss Marguerite Walmsley, New Bedford, Mass.; Walter F. Watson, Lowell, Mass.; Robert C. Webster, Barber & Colman, Boston, Mass.; William Welch, Draper Company, Hopedale, Mass.; Mrs. William Welch, Hopedale, Mass.; I. A. Whitcomb, Somerville, Mass.; Mrs. I. A. Whitcomb, Somerville, Mass.; W. W. White, Worcester, Mass.; Mrs. W. W. White, Worcester, Mass.; Eben C. Willey, Boston, Mass.; Fred A. Wilde. A. T. Atherton Mch. Co., Pawtucket, R. I.; Mrs. Fred A. Wilde, Pawtucket, R. I.; Jno. B. Wild, Utica, N. Y.; C. J. H. Woodbury, Lynn, Mass.; Mrs. C. J. H. Woodbury, Lynn, Mass.; Miss Alice P. Woodbury, Lynn, Mass.; Miss Laura B. Woodbury, Lynn, Mass.; Miss Louise Woodbury, Lynn, Mass.

HERBERT E. WALMSLEY, PRESIDENT OF THE NEW ENGLAND COTTON MANUFACTURERS' ASSOCIATION.

The program was carried out in accordance with the itinerary. The party arrived in Boston at 5.15 p. m. Friday, and unanimously agreed that the convention and excursion just completed had been a success in every particular. Much credit is due Mr. Woodbury for the admirable arrangements for which he was responsible and the excellent carrying out of the same. Many expressions of appreciation were justly extended to Mr. Stephen C. Lowe and Mr. H. J. Ballou for their efforts in making the musical and social ends a success.

Following are the president's address and the papers read:

PRESIDENT'S ADDRESS.

Herbert E. Walmsley, New Bedford, Mass.

Gentlemen of the New England Cotton Manufacturers' Association, ladies and gentlemen:

In rising to address this convention, I deem it fit and proper that my first words should be an expresion of my appreciation of the honor conferred upon me by the Association in electing me its chief executive at the annual meeting held in the city of Boston last April; permit me further to say that I esteem it a distinction worthy the ambition of every member of the Association.

As you are aware, our Association is distinctly and peculiarly representative of the great cotton manufacturing industry, an industry representing, on the one hand, a vast amount of money invested in cotton manufac-

turing establishments—some five hundred million dollars, with all that this implies—and, on the other hand, finding employment for many thousands of families, for so many thousands of our fellow human beings, whose daily bread depends upon the successful conduct and operation of this great industry.

I take this opportunity and, at the same time, it affords me infinite pleasure to acknowledge the debt the Association owes its Secretary and Treasurer—Mr. Woodbury—for the painstaking, conscientious, and thorough work he has done in the past, and is doing today, in the interests of the Association, he will pardon me if I say that to him, perhaps more than to any other individual man, belongs the credit of having brought the Association to its present standing. In this I feel sure of the generous assent of all who have been active in the work and in the councils of the Association.

Gentlemen! the unsatisfactory condition of the cotton trade at the present time is unfortunate and regrettable, business being confined today—as it has been for several months past—to absolute requirements; the past few months have been one of the most difficult periods we have perhaps ever experienced; the prevailing quietude in the trade has undoubtedly been intensified by the raw material situation.

It appears to me that what has created possibly the greatest difficulty has not been so much the cessation in the supply of the raw material itself, but the temporary cessation of that supply coupled with the speculative manipulation we have lately witnessed.

It has been a physical impossibility to buy what cotton there was available at prices that would permit the manufacture of the raw material, only at absolute loss to the manufacturer.

The prosperity of the cotton trade must, in my judgment, be dependent primarily upon a cotton crop sufficiently large for the world's requirements, and a crop of sufficient magnitude to make it too risky and dangerous a proposition for the speculators' greed.

It is a deplorable circumstance that the pernicious practice of cornering such a necessary staple as cotton should be possible, demoralizing and paralyzing, for the time being, an industry of such immense wealth to individuals and to the Nation as that of cotton manufacturing, throwing out of employment, and reducing to the verge of starvation the thousands of families whose very existence is dependent upon the continued and steady operation of the factories where they find employment.

The baneful influence of this speculative manipulation of cotton is a matter for serious concern, involving consequences of an injurious kind to so large a part of the community and the public collectively, and for which there can be no justification whatsoever.

The force of these considerations should surely be sufficient to justify some concerted and united action toward putting a stop to the gambling operations which inflict such widespread suffering and injury upon so many and such important interests.

It will be a boon of inestimable value to the entire manufacturing world when the efforts now being made to grow cotton in other countries in sufficient quantity and of the required staple are successful, as undoubtedly in the course of time they will be.

It must be recollected, however, that it will in all probability take some years before the results can be counted upon as a practical factor in the situation; meanwhile it devolves upon every man connected with the cotton trade to make emphatic protest and seriously consider every proposal with the object of putting an end once for all to the vicious and unhealthy practice referred to.

At a time like the present, when the effects of Southern competition are being prominently brought into notice, the necessity surely exists for determined and emphatic protest against the unduly long hours worked in the Southern cotton mills; every possible influence should be brought to bear with the object of securing a more nearly uniform and maximum "labor-day" both North and South.

It is beyond question that any increase in the number of hours of labor beyond that maximum is bad in its effects on the quality as well as on the quantity of the output, besides being admittedly injurious upon the

physique, and general health of the operatives.

Well aware, as we all of us doubtless are, of the difficulties surrounding the question of interference in this matter, some authoritative form of intervention is surely legitimate and justifiable.

In this connection the point I desire to lay stress upon is that intervention is legitimate where the well-being and interests of others are injuriously affected, as in this particular, and where intervention would be useful and beneficial all round. We are convinced beyond peradventure that, in the natural order of things, and in due course, the hours of labor in the Southern cotton mills will be reduced precisely as they have been in New England and elsewhere; this is as certain as it is certain that the sun shines; it does not follow, however, that we should remain passive, and sit quietly by awaiting the event of that time.

I do not believe in the man who recognizes an evil, denounces it, and wishes that evil removed, and yet will not raise a little finger to help remove it.

Let it not for a moment be imagined that we in the North fear or are jealous of Southern competition on legitimate lines; on the contrary we warmly congratulate the South on the great development of its natural and industrial resources.

We know of no divine right by which the North can claim a monopoly in the manufacture of cotton goods; there is surely ample room for both North and South both at home and in competition with the old world in the densely populated countries of the far East, in Africa, and other neutral markets.

The supremacy of cotton manufacturing in New England is not, in my opinion, in jeopardy; it is and will continue to be unassailable.

It is as firmly established and as impregnable as the Rock of Gibraltar, and whilst we cannot prudently ignore Southern competition, there is no need for hysteria or alarm; it is simply history repeating itself.

The competition and the increasing competition of the modern mill with the mill of old time structure and equipment is the problem to be solved by the older mills, and it is being solved, and will continue to be solved correctly, and in the only way, by the men who are today confronted with that problem.

It has been my privilege within a very recent period to inspect two or three mills of the very latest and most approved construction; the guiding and leading principle in the construction and building of these mills, and in their equipment, in fact, in their every detail from foundation to roof has evidently been the securing of the very best that human ingenuity and past experience could design and devise, and in this they have succeeded perhaps beyond expectation.

Further, the quality of the yarns and cloths being made in these self-same mills is of the highest character and excellence from the raw cotton to the woven fabric, it being clearly apparent and self-evident that the managers and executive heads of these corporations fully realize that their future success depends upon the superiority of their output, appreciating as they undoubtedly do the fact that quality carries with it quantity and economy, and further commands both preference and higher or better prices in the open market, leaving others to compete for the poorer and cheaper grades of goods where competition is keener and margins are closer. These men, in my judgment, have read aright the signs of the times, and, grasping the situation as they correctly have done, will undoubtedly in time reap the reward of their foresight and sagacity, and for which they are to be commended and their stockholders congratulated.

I have purposely laid stress upon this particular point, being convinced, as I ever have been and ever shall be, of the vital importance of thoroughness and true excellence in its fullest sense and in every particular.

One of the distinguishing characteristics of the present day is the rapid progress being made in almost every branch of industry; the rapid productive growth in the manufacture of cotton goods alone is much beyond what any natural growth in home trade would warrant, and must find its justification in a liberal extension of the export trade in cotton goods; the marked increase in American exports to China, the opening up of new markets in Cuba, Porto Rico, and the Philippines

furnish wider outlets; nevertheless, close attention to and intelligent cultivation of still other fields will be necessary if the evil of over-production is to be avoided. Naturally when trade is good there is a tendency to extend and rapidly overtake the demand by increased production; we should not, however, consume ourselves by unreasonable competition within our own borders.

By the very necessities of our industrial and commercial expansion, increased opportunities and markets which present the greatest field for our manufactured products, and especially for the sale of our over-production, must be steadily and persistently cultivated.

If I am correct, the population of this country doubled itself during the last 33 years, and now numbers some 80,000,000 people; if we continue to increase in like ratio, the population say 33 years hence should be 160,000,000.

This is a matter for congratulation and hope for the future, if we put intelligence into our work with the courage and perseverance of the Anglo Saxon race.

The contest among the nations in the future, if not already upon us, will be for industrial and commercial supremacy.

America today holds a foremost place in the struggle, and American activity and enterprise are destined to conquer the trade of the world.

It is important to observe, and I take it perfectly proper to emphasize the fact that the pronounced and marked improvement and advance made in the character and quality of the cotton goods manufactured at the present time is largely the outcome of improved machinery.

A word with reference to the technical education movement: We are told that among the many causes that have contributed to the advancement of German industry are the educational conditions upon which Germany has relied so largely in the past for the maintenance and remarkable development of her industrial progress.

The importance of technical education is fully understood in this country; nevertheless, we must see to it that neither Germany nor any other country surpass us in this particular, never losing sight of the fact that the continuance of our prosperous existence as an industrial and commercial people depends upon our ability to compete in the great markets of the world with our European rivals.

We cannot live without exchanging the work of our hands and the thought of our brains with those of other nations.

If they surpass us in intelligence, we shall become poor and incapable in comparison with them.

Excellent work is being accomplished by our textile schools, and must form one of the chief elements of our success in commercial and industrial prosperity.

Regarded from the economic or industrial point of view, how important then is the question of technical education; that this sentiment has taken possession of the people of this great and rapidly evolving country is manifested by the readiness and munificence with which either as individuals or as communities they establish, throughout the length and breadth of the land, agencies whose functions shall be the industrial enlightenment and artistic training of its citizens.

There must be no disposition to remain satisfied with past or present achievements.

The wisdom of appropriating from the public funds such moneys as may by the authorities be deemed proper and sufficient for the encouragement of the technical instruction movement can scarcely be questioned or criticised.

Gentlemen, it is no part of the design of my address to make any unwarrantable tax upon your attention by plunging into abstract speculation on the economic problems affecting modern industrialism; still, in passing, I venture with all respect to submit that such a vexed question for instance as industrial unity, and again the question of the so-called trusts are perfectly legitimate topics for investigation, consideration, and discussion by this Association.

From the standpoint of either employer or employed, it is admittedly difficult to assume an unbiased and unprejudiced attitude in connection with it.

We all of us doubtless fully realize how delicate a matter it is to deal with such a subject as the relations between employer and employed; one runs the risk of offending the for-

mer and as regards the latter they are perhaps naturally suspicious of a manifestation of regard from one not of their own ranks, and are apt to think one has some purpose of one's own to serve.

In this connection, however, I venture to affirm that the great majority of employers in their relations with the employed are animated by the desire for the betterment and amelioration of the lot of the vast masses of toilers whose daily lives are spent in the busy hives of industry now so widely dotted over the face of this vast continent; let us hope this will ever be the universal object of human desire.

It is not my purpose on this occasion to enter into any controversy, or to say anything that might be construed as ill-will in connection with trades unions as such; there is, however, one most important phase of the question of employer and employed which I trust I may with propriety refer to, and upon which, I take it, there can be no two opinions from the employer's standpoint, and with which opinion the employees should coincide, and must conform to. I refer to the management and direction of our industrial corporations.

The managers alone must manage and direct the great interests they are intrusted with, and for which they alone are responsible, without any outside interference whatsoever; there can and must be no copartnership in this respect, and it is important that this position be clearly defined and distinctly understood.

The question of industrial combination, or co-operative amalgamation, is one of deep significance and engrossing interest as affecting the general welfare, and about which everyone doubtless has his own notion; the subject of these gigantic trusts is an awkward one but, nevertheless, should not, in my judgment, be evaded on that account.

Personally I do not regard these so-called monopolies as necessarily harmful to the mass of the people if conceived, financed and managed upon recognized sound principles and methods.

If, on the other hand, they are promoted to promote the little interests of one little order of men, they undoubtedly hurt the interests of all other orders of men; but again, and this is a very important point, it may be that these big combinations place us in a stronger position and more able to compete with and beat down other countries in the commercial struggle, and, if so, may be regarded here as perfectly legitimate.

One naturally learns as one gains wider knowledge to be guarded in one's utterances on these complex problems, nevertheless, we cannot escape them if we would; occupying and agitating, as they do, the minds of all thoughtful and thinking men, permit me to add that I trust they will, in the future, receive at the hands of this Association the consideration their importance demands.

The universal tendency to move, to advance, and to grow with the natural progress of a vast and prosperous country, a country rich in all the resources of nature, and free in all her institutions, combined with the impulse of an energetic and indomitable national genius, ought to keep the United States of America ever in advance of the never ending duty of achieving a higher civilization.

The Influence of Electricity on the Development of Water Powers; Frederic A. C. Perrine, D. Sc., Pittsfield, Mass.

Storage Battery Locomotives for Mill Yards; Edgar H. Berry, New Brighton, N. Y.

Gambling in Cotton; Joseph D. Aiken, Taftville, Conn.

Advantages of Steam Turbines for Textile Mills; Austin R. Dodge, Schenectady, N. Y.

Mud Fuel; Edward Atkinson, Boston, Mass.

Blending of Cotton; Daniel Clark, Frankford, Philadelphia, Pa.

Bobbin Filling; Its Tendency to Kink; John Gregson, Fiskdale, Mass.

The Adjustment of Cotton Preparing and Spinning Machinery; Eben C. Willey, Boston, Mass.

AN IMPROVEMENT IN CARDS.

By William Hayes, Auburn, Me.

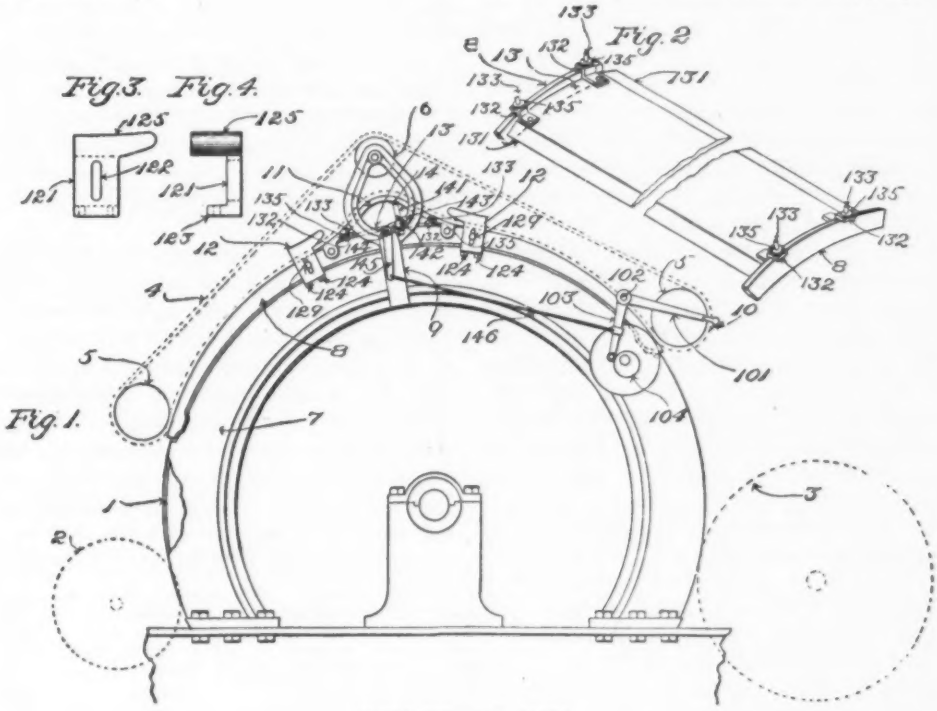
I will only take a few minutes to present to you the "Batten and Hayes" patent, which is an additional top stripper to the revolving flat card. Mr. William Batten is my carder

at the present time. He grew up with the revolving flat card in England while I grew up with the old American double-carding system which many noted mills still retain.

We were talking one day about the ins and outs of the two systems when he remarked that he thought the tops could be raised in some way and stripped as they proceeded in their regular traverse, so we joined our efforts and the result is the invention shown in the illustration.

twice from card in question and it tested five pounds above my regular yarn and regular process and the yarn looked smoother to us.

Our patent is simply an arch or bridge on top of cylinder over which the tops pass, and are stripped and then returned to the cylinder clean. These samples were made from card in question and the tops were moving one-third slower than usual. This additional stripper makes a low type of card stripping but the regular and second strippings are



IMPROVEMENT TO CARDS.

No. 11. Arch over which tops pass for stripping.
No. 13. Plate which covers cylinder under arch.
No. 132. Brackets which hold plate down.
No. 14. Stripping comb.
No. 9. Brackets which hold bearing of stripper rod.
No. 125. Brackets which hold tops as they approach and leave the bridge, same as No. 12 in position.
No. 146. Which connects combing motion.

You will notice samples of second drawing from 45 inches Pettee card carding 200 pounds in ten hours with the "Batten and Hayes" patent. The patent is new and has not as yet had extended and varied tests.

We use strict middling 1 1/8 inches cotton at Barker Mill, Auburn, Maine, and we put 25 per cent. more work on to the card and still got less fine fibre and the staple lay more parallel. We have made yarn number 28 white and clean and contain considerable full staple and can, we think, go back into the work up to 35 or perhaps 40 yarn without being noticed or doing any harm. We have shown this sample sliver to several noted mill men from Maine to South Carolina and their comments have been very gratifying.

This attachment was put in at mill without any outside help. Plate made in mill shops, tops covered by hand with rivets, so these

samples of sliver shown at this time we have reason to believe are not so good as they will be when the attachment is put on by regular card builders.

WAXES IN WARP SIZING.

By Daniel Moore Bates, Wilmington, Del.

Last Spring your attention was drawn to the reappearance of waxes in the sizing of warps. We had then just commenced at Rockford an investigation of a number of samples of sateens of various counts and weights, in connection with trouble experienced in our dyehouse in getting some of our colored work evenly dyed. As previously stated, we found in some cases "that the warps were coming up lighter in shade than the filling yarns, causing the sateens to have a threadbare, starved look."

Below is a table of the results obtained. Each set of samples is from a different mill, and the figures given show the amount of waxy matter found in a half yard of the goods in the gray, after wetting out and steeping, and after full bleaching. Our chemist, Mr. Leonard Yerkes, extracted all the samples with ether, subjecting each to exactly the same treatment. A sample of raw cotton (Texas middling) was also tested in the same way. The figures therefore may fairly be compared, one with another.

Sample	Description	Gray. grams	After steeping. grams	After full bleaching. grams	Percentage wax from gray sample
1	31½ in. 64/124, 5.50 yd.	0.2037	0.2103	0.1098	0.49
2	39 in. 96/136, 3.75 „	0.3904	0.4496	0.2391	0.65
3	33½ in. 96/150, 5.50 „	0.1907	0.2196	0.0905	0.46
4	39 in. 96/160, 4.10 „	0.4709	0.3076	0.1724	0.85
5	39 in. 96/160, 4.15 „	0.2978	0.1477	0.1333	0.54
6	40 in. 96/172, 4.25 „	0.3147	0.3607	0.1471	0.59
	Raw cotton (10.3 grams)	0.0426	....	....	0.41

The table shows that some samples contain little more waxy matter than is found from the ether extraction of raw cotton, while others contain over 50 per cent. more. At the same time, in all cases the bleaching removes only about one-half of this, indicating that waxes added to the warps in sizing are equally as difficult to remove as those found native in the cotton fibre. A curious result of the experiments is that in two-thirds of the cases, more waxy matter is obtained from the steeped sample than from the gray sample. Apparently this is due to the steeping so opening up the goods that the ether has a better chance to act and consequently extracts the waxes more thoroughly.

In the case of sample No. 2, the swatches were each pulled apart before extracting, and the warp and filling extracted separately. The following figures show the result.

	Gray grams	After steeping. grams	After full bleaching. grams	Percentage wax from gray
Warp,	0.2529	0.2779	0.1113	0.80
Filling,	0.1375	0.1717	0.1278	0.43
Total,	0.3904	0.4496	0.2391	

As seen, the waxes in the warp are almost double in amount those found in the filling, the latter being only slightly in excess of the percentage of waxes found in the raw cotton. This points very clearly to the use of waxes of some kind in sizing the warps of this lot of goods.

By a curious coincidence, the two samples showing most wax are from goods invoiced to us the longest time ago, while the two showing least wax are from lots invoiced us most recently of those tested. At the same time, the trouble which we experienced last winter in our dyeing has largely disappeared. This may be merely a coincidence, but it looks as if the matter of warp sizing as regards the use of waxes had already been taken in hand by the mills, so that we are even now feeling the benefit of their investigations. That the use of waxes in warp sizing was prevalent a few months ago among some mills seems undoubtedly true, for in addition to our own experience and investigation, we have heard from different sources of similar experiences among New England bleacheries.

It is probable that no manufacturer of cotton goods who is in touch with the bleaching end of the business, would knowingly use waxes in his warp size, but the danger lies in the use of sizing compounds manufactured

and marketed under fancy names, of the composition of which the user has no knowledge. If it is expedient to use a manufactured compound in size, surely there is little difficulty and expense in having a sample analyzed by a chemist, thus putting beyond all question the effect of such a compound on the bleaching and dyeing of the cloth.

Following is a list of the new members elected:

Chas. E. Childs, treasurer Hampton Company, Easthampton, Mass.; Mark B. Creed, superintendent Wamsutta Mills, New Bedford, Mass.; John H. Dunn, superintendent Tremont and Suffolk Mills, Lowell, Mass.; H. J. Forsythe, superintendent the Sibley Manufacturing Company, Augusta, Ga.; Walter R. Garsed, manager Wingohocking Cotton Mills, Frankford, Philadelphia; E. Stanley Gary, vice-president Gary Manufacturing Company, Baltimore, Md.; Frederick Stuart Greene, American Manufacturing Company, New York; James Henry, Thomas Henry & Sons, Philadelphia; William G. Henry, Thomas Henry & Sons, Philadelphia; Hiram Higham, superintendent Wamsutta Mills, New Bedford, Mass; Ronald T. Lyman, assistant treasurer, Boston Manufacturing Company, Boston, Mass.; Alexander Makepeace, superintendent Richard Borden Manufacturing Company, Fall River, Mass.; John G. McFadden, superintendent Nottingham Mill, Providence, R. I.; Walter H. Paige, superintendent Wamsutta Mills, New Bedford, Mass.; Lavater W. Powers, superintendent Bristol Manufacturing Company, New Bedford, Mass.; Albert E. Schofield, Delphi Spinning Company, Philadelphia; Samuel Taylor, superintendent Soule Mill, New Bedford, Mass.; Berton A. Thissell, superintendent Boott Cotton Mills, Lowell, Mass.; William T. Westerman, manager Ontario Spinning Company, Philadelphia, Pa.; Paul Whitin, assistant treasurer Paul Whitin Manufacturing Company, Northbridge, Mass.; Lewis J. Young, superintendent Gault Mills, of Montreal Cotton Company, Valleyfield, P. Q., Canada; W. C. Plunkett, W. C. Plunkett & Sons, Adams, Mass.

Associate.—Chas. B. Burleigh, Textile Power Department, General Electric Company, Boston, Mass.; John Henry English, English-Greene Company, Providence, R. I.; Vladimir F. Gnesin, sole agent of the Great Varoslavl Manufacturing Company, Moscow, Russia; Joseph C. King, ring traveler department Morley Button Manufacturing Company, Boston, Mass.

A NEW PROCESS OF MERCERIZING.

A recent issue of L'Industrie Textile contains an account of a new process of treating cotton which is claimed to be much superior to the present mode of mercerizing, both in respect to lustre obtained and the elasticity of the cloth. Considerable mystery surrounds the process and the inventor, M. Karge, Coblentz, Germany, states that the exact details of the process are withheld pending the issuance of patents. The new method is said to be much more simple and less expensive than the regular mercerizing process, the cotton being treated in the form of sliver or slubbing. It is said that the method is based upon a new principle which has been discovered after many trials and practical tests which have thoroughly demonstrated its value.

The yarn comes from the spinning machine already mercerized and colored. In regularly mercerized cotton the strength of the yarn is increased about 25 per cent., but the elasticity is lost. By the new process the strength of the yarn is increased only about 5 per cent., while the elasticity of the thread instead of being decreased is actually increased. This, if true, will be of great advantage in the manufacture of knit goods where elasticity is of prime importance. It is also claimed that the process is adapted for ordinary American cotton although better results are obtained with Sea Island and Egyptian. The cost is about one-tenth that of mercerizing. The affinity of the yarn for dyestuffs is equal to that of mercerized cotton and the color goes on the fibre very uniformly.

Instead of five operations necessary for mercerizing, i. e., boiling, mercerizing, souring, washing and drying, the new process requires but two. It is said the yarn does not contract in length as in the case of mercerizing, and that no change in the spinning machinery is necessary. The inventor goes so far as to say that the production of one machine in ten hours is 4500 pounds, the work requiring but one operative. He also says that his experiments indicate that the process is as well adapted for linen as for cotton. Certainly if the claims made for this machine are substantiated, it means a great improvement in the manufacture of cotton and linen goods.

The cultivation of ramie was first introduced into the United States in 1855. Experiments made since that time show that it may be successfully grown in the Southern states and in California.

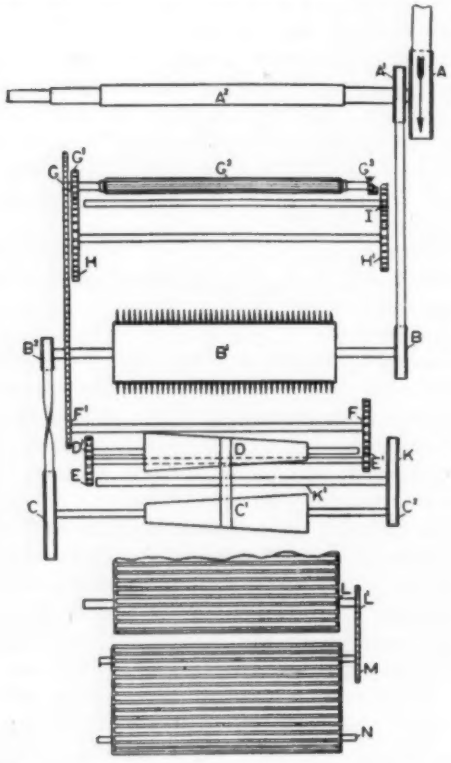
TEXTILE PROCESSES.

EDITED BY E. A. POSSELT.

POINTS ON PICKING AND SCUTCHING WITH CALCULATIONS FOR THE PREPARATORY DEPARTMENT OF A COTTON MILL.

(Continued from September.)

Instead of using a leather stripped beater for the elevating apron a spiked beater is substituted, as shown at B^1 in Fig. 2. The beater shaft A^2 carries either a two or three bladed beater, or in some cases a porcupine beater as shown in detail in Fig. 3. It is made up of a number of steel disks A (15 in



our illustration) turned to a given diameter and having a series of hardened steel fingers B riveted to them. The disks A are placed on a shaft C over a key, and separating pulleys D of the required width placed in series between the disks, also over the key; the fingers B being so offset that one revolution of the cylinder covers the entire width of the feed rolls, the ends being ground so that their strike is parallel to the feed roll. The disks and separating pulleys are clamped together on the picker shaft by jamming nuts on either end of shaft and by tie bolts running endwise through the cylinder. The cylinder is accurately balanced and has no openings through which sand, etc., can enter to cause it to run out after being used a short time. In case of accident to fingers or plates through hard substances getting into the machine, the damaged portion can be easily removed and replaced. Below are given alphabetically, letters of references accompanying the plan view of the machine.

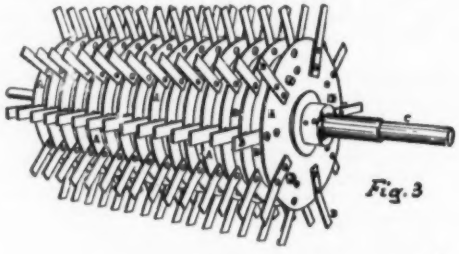


Fig. 3

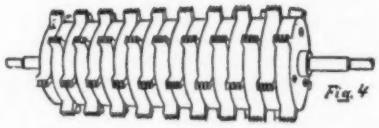


Fig. 4

A—Beater or Cylinder Pulley.

If with 18 in. diam. Rigid Beater or Improved Carding Beater, A is 9 in. diam. × 4 1/4 in. face: usual speed 1,450 r. p. m.

If with 30 in. diam. Cylinder Beater, A is 16 in. diam. × 4 1/4 in. face: usual speed 550 r. p. m.

A^1—Feed Pulley.
If with 18 in. diam. Rigid Beater or Improved Carding Beater, A^1 is 6 in. diam. × 2 1/4 in. face.
If with 30 in. diam. Cylinder Beater A^1 is 10 in. diam. × 2 1/4 in. face.
A^2—Beater Shaft—1,450 r. p. m.—18 in. diam. Beater: 550 r. p. m. 30 in. diam. Cyl. Beater.
B—Spiked Beater Pulley.
If with 18 in. diam. Rigid Beater or Improved Carding Beater, B is 16 in. diam. × 2 1/4 in. face.
If with 30 in. Cylinder Beater, B is 10 in. diam. × 2 1/4 in. face.
B^1—Spiked Beater—14 in.
B^2—Bottom Cone Driving Pulley, 6 in. diam. × 2 1/4 in. face.
C—Bottom Cone Pulley, 16 in. diam. × 2 1/4 in. face.
C^1—Bottom Cone, driving Top Cone.
C^2—Comb Driving Pulley, 5 in. diam. × 2 1/4 in. face.
D—Top Cone.
D^1—Spiked Apron Top Shaft Driving Gear, 16 T.
E—Spiked Apron Top Shaft Gear, 69 T.
E^1—Spiked Apron Clutch Driving Gear, 17 T.
F—Spiked Apron Clutch Gear, 58 T.
F^1—Bottom Feed Roll Sprocket Driving Gear, 14 T.
G—Bottom Feed Roll Sprocket Gear, 24 T.
G^1—Wood Roll Driving Gear, 48 T. (Wood roll 4 1/2 in. diam.)
G^2—Bottom Feed Roll, 2 1/4 in. diam.
G^3—Top Feed Roll Double Driving Gear, 6 T.
H—Wood Roll Gear, 120 T.
H^1—Feed Apron Driving Gear, 96 T.
I—Feed Apron Gear, 58 T.
K—Comb Pulley, 16 in. diam. × 2 1/4 in. face.
K^1—Comb Shaft.
L—Spiked Apron Bottom Shaft.
L^1—Feeder Apron Back Shaft Driving Sprocket Gear, 18 T.
M—Feeder Apron Sprocket Gear, 28 T.
N—Feeder Apron Front Shaft.

Calculations:—Say we have a two bladed beater in the picker, making 1450 revolutions per minute, and want to know how many blows per inch the cotton is struck. Giving the beater shaft 1450 revolutions we first find the number of revolutions of the bottom feed roll, as follows:—

$(1450 \times 6 \times 6 \times 5 \times 16 \times 17 \times 14) \div (16 \times 16 \times 5 \times 69 \times 58 \times 24) = 8.08$ revolutions of feed roll per minute. Then $8.08 \times 2\ 1/4 \times 3.1416 = 57.114$ in. surface speed of roller G^2 per minute. And $2 \times 1450 = 2900$ blows of beater per minute. Giving in turn $2900 \div 57.114 = 57$ blows per inch.

Several other methods are employed in handling the cotton after it leaves the hopper feed, one being in conveying the cotton from the hopper feed through cleaning trunks to the gauge box or screen section at the back of the picker and feeding it from there actually to the picker.

In other cases the cotton is passed directly from the hopper feed through the cleaning trunks to the breaker scutcher, or again as is sometimes done, the cotton goes directly on to the traveling lattice in the rear of the breaker scutcher. In this case, as the cotton passes to the breaker scutcher or lapper, it goes through a pair of feed rolls and is then acted upon by a porcupine cylinder beater. This beater is slightly different from that described in connection with the hopper feeder, and is shown in Fig. 4. It will be seen that instead of having the separate fingers as in the case mentioned before, this beater has wider arms, the ends being grooved like teeth. The arms in the same row are on alternate pulleys, the arms on the other pulleys forming a line midway between those of the first mentioned pulleys.

There is sometimes another beater in the breaker scutcher, the object now being to extract as much of the impurities, the cotton still contains, as possible. Grid bars are used under the porcupine beater and are placed under the passage of the cotton from the beater to the first cages. From these cages the cotton passes through a pair of feed rolls and is then struck off by the two bladed beater. Grid bars are also placed under this beater, and in the passage from the beater to the second cages. Two fans are used, one under each pair of cages, so as to blow the cotton through the machine. From the

second cages, the cotton, having thus been formed into a loose lap, is passed through a pair of drawing-off rolls to the heavy calender rolls in the front of the machine. These rolls press the cotton more firmly into a lap, which in turn is wound up by friction from the two large fluted rolls in front of the calender rolls. This machine, being the first one to put the cotton into the form of a lap, will necessarily make a very imperfect one, but a great deal can be done toward uniformity with the proper knowledge and experience with the machine.

There is one great objection to scutchers as fed by trunking and that is that when the scutcher knocks off after making a sufficiently large lap, the cotton still continues to be delivered to the back end of the machine. In stopping the scutcher when the lap is full, only those parts which actually deliver the cotton are stopped up and including the feed rolls. This allows the cotton to collect at the back and when the scutcher is started up again, the lap would be made very thick if some means was not taken to prevent it. Many contrivances have been devised to overcome this difficulty, the most satisfactory ones being the use of a condenser and gauge box. In this instance the cotton as delivered to the scutcher through trunk connection from the picker, in turn enters the condenser and gauge box of said scutcher. In the top of the condenser is a revolving screen cage on the inside of which is a stationary shield or cradle which covers a little more than one half of its surface; the air current passing through the perforations of that portion of the cage as is not covered by the cradle. The cotton, as entering the condenser at its top, is in turn deposited upon the open side of the screen cage, the ends of which open into a dust passage as is situated on the outside of the gauge box. The air, by the action of a suitably situated fan, passes out through the ends of the cage referred to, down dust passage and from which it is forced through a flue to the dust room, taking along a great many impurities from the cotton. As the screen cage slowly revolves, the cotton as deposited upon it is brought around between it and presser rolls. The stationary shield or cradle, previously mentioned, at this point covers the screen cage, and thus prevents air from passing through, in turn permitting easy stripping of the cotton from the screen cage by the presser rolls, as rotating reversely to the rotation of the screen cage, and which rolls deliver the cotton upon the feed apron of the scutcher. The gauge box of the machine has a front and back chamber, respectively formed by a swinging partition which regulates the amount of cotton to be delivered on the feed apron. The front chamber receives the cotton as it falls from the presser rolls and is normally kept about half full, but, with the stopping of the scutcher and picker, the cotton is drawn out of the cleaning trunk and in turn fills this front chamber, while any surplus in supply falls over the swinging partition as forming the back of the front chamber and into the back chamber, which has suitably located a door through which said surplus cotton, when required, is removed by hand for reworking. The cotton in the front chamber in turn serves as a temporary source of supply until the picker, cleaning trunk and its connections provide the regular supply of cotton to the machine. The swinging partition which divides the two chambers can be adjusted by means of a pin as fitting into a series of holes bored in the bottom of the board which forms the bottom of the back chamber, to in turn cover more or less of the surface of the feed apron, in turn making the feeding lighter or heavier as the case may require.

For removing laps the entire machine is not stopped, but only those parts which convey the cotton to the delivery rolls. The parts are stopped by dropping a lever to which is attached a stud and gear the latter connecting with the parts of the machine which convey the cotton through the scutcher, and the lever is lowered automatically or, as it is called, knocked off. The parts of the scutcher that are stopped are the four smooth calender rolls, the screen sections, the aprons, which convey the cotton to the different parts and the feed rolls. There is a rod that runs down and stops the lifting apron of the hopper and also the

aprons that convey the cotton to the opener so that parts running are the beaters on the hopper and picker and the beaters on the scutcher. The only other parts of the scutcher in motion are the two large fluted calender rolls on which the lap rests. There are several contrivances added to scutchers by means of which more or less air current may be obtained and also the current may be directed to different parts by several doors and flues placed at various parts of the scutcher. The air current can also be regulated by either increasing or diminishing the speed of the fans. The draft will be broken, as will readily explain itself, by opening the doors to the flues, a convenient way being to place a small block of wood at the top of the door, it being opened outward at the top for this purpose, the current of air as is passing through the machine producing sufficient suction to draw the door hard enough to keep it from falling backward. The proper amount of draft on the cages of a scutcher is of the greatest importance for perfect work. There is no fast rule for regulating it, as conditions vary with reference to different makes of machines as well as different classes of cotton under operation.

SETTING THE BEATER TO THE FEED ROLLS

also requires careful consideration, since the distance must be varied to suit different length of staple under operation; a 1 7/8 in. Sea Island cotton naturally calling for a totally different setting compared with a 7/8 in. Upland staple.

The distance between the feed roll and the beater may be regulated either by setting the beater to the feed rolls, or by altering the feed rolls in relation to the beater. The disadvantage to the first case is that the shaft is apt to be set unevenly and thus cause it to bind, and consequently wear the bearings or the shaft owing to the high speed of the beater. By setting the feed rolls this difficulty is obviated as the same revolve very slowly, a feature which makes this method of setting more preferable to changing the position of the beater. The exact distance to set the feed roll from the beater, that is, the "bite from the blow" is regulated not only by the length and grade of staple used, but also by the bulk of cotton fed. The scutcher also contains a contrivance for stripping such of the cotton as clings to the edge of the beater, this being accomplished by placing a rail in the box close up to the beater, so that the cotton will be knocked off as the beater comes around, after having struck the blow. An improvement has been made in these rails by making them adjustable, so that the liability of neps caused by having them set too far from the beaters is reduced to a minimum. When a beater has to be sharpened, the amount thus ground off can easily be taken up by setting the rail closer to the beater. Very close setting is required for the rail, the beater just passing without touching. The rail is so attached to the beater that it does not require resetting even when the beater is reset.

LAPS.

The production of good work consists chiefly in making an even lap, and failure to do this will give uneven working, more or less throughout the whole mill.

There are many causes for uneven laps, which may appear trivial at first sight, but in the end really make the trouble.

One of the causes for the production of uneven laps frequently can be traced back to the feed of the hopper feed, that is, by having too little cotton taken up by the elevating apron which, is caused by leaving the supply of cotton in the hopper chamber run too low, a feature which can readily be remedied by properly filling said chamber.

Another cause of uneven laps is by having the racks which hold the rod in the lap as being wound, press down with uneven weight on said rod, thus causing the lap to be pressed tightly at one side and loosely at the other, thus causing unequal stretch in the width of the lap, which of course is the reason for the unevenness of said lap.

It often happens that the laps split when they are unwound, and as this is a serious defect, the cause should be traced at once. In most cases the air current is not directed to the proper place and if this is the case should be directed so that most of it goes to the hopper cage and this as near as possible to the centre between the cages.

Partial obstruction of the trunking will cause the cotton to be blown to one side and consequently cause uneven laps through the width. The obstruction may be a grate bar which projects higher than the others or a piece of wood or other foreign substance which has entered the trunk and which can easily be removed when located. The lap made on the machine will sometimes be found cut every little while and this without any apparent reason, but on examination of the cages, in all likelihood the set screws which fasten them to the shafts will be found loose, thus allowing the cages to remain stationary for an instant every little while, especially if a large lump of cotton comes between the cages, said stoppage of the cages being the cause of the lap to break. This defect is easily remedied by simply screwing the set screws up firmly.

Rough selvages are sometimes made, caused by the edges of the cages being rough, so that the cotton is partially pulled out by the projecting wires. Some of the cotton clings to the cage and becomes hard so that it acts to push the cotton directly under it out as it comes in contact with the other cage. The evil is remedied by lining the edge of the cage with a strip of sheep skin, which prevents any cotton from catching on to the cage.

Uneven laps will again be caused by an insufficient fan draft, a feature which can be easily noticed by watching the cotton as it is thrown up to the cages from the beater. The lack of enough draft will cause the cotton to move very slowly toward the cages, while it should, under proper conditions, attach itself to the cage in a quick manner. The above causes for irregular work will often occur in the machine, it remaining for the overseer to ascertain which of them are at the bottom of the bad work and how to remedy it.

(To be continued.)

The finest flax in the world—the famous flax of the Courtrai region in Belgium—is retted in the river Lys, the grounds on both sides of the river for many miles being used as steeping grounds.

AN IMPROVED ANTI-SNARLING MOTION FOR SPINNING MULES.

This motion has for its object to prevent the forming of snarls or kinks in the yarn, by having it become slack for an instant, and when, owing to its twist, the same will have a tendency to kink. This slackness to the yarn occurs when the carriage has just run in and the fallers are getting into position ready for the next outward run of the carriage. When the fallers thus change positions, a certain amount of yarn (varying according to the varying size of the cop has been built) is pulled off the top of the cop, producing in turn kinks, which to prevent is the object of this antisnarling motion.

The principle by which snarling or kinking of the yarn under operation is prevented, is to start the feed rollers to deliver the roving a moment after the carriage has commenced its outward run, the cop in this manner taking up the slack as previously produced before any more roving is delivered by the feed rolls. In the same manner as thus providing this antisnarling motion for the ordinary mule the same can be used to start the feed rollers later on mules having a "roller motion while winding," that is, a short length of roving is delivered by the feed rolls during the run in of the carriage and when a portion of the twist in the yarn runs down into the roving.

In order to explain the motion for starting the feed rolls after the carriage has started out, and the mechanism as applied to a mule using the "roller motion while winding," the accompanying illustrations are given and of which Fig. 1 is a side elevation of the head of a mule and the principal parts of the carriage. Fig. 2 is a vertical section through the feed roller clutch mechanism. Fig. 3 is a partial front view of the clutch mechanism showing its connections and operation. The diagram A as shown in connection with Fig. 1 is a cross section of a clutch member on the feed roll, showing how it drives said feed roll.

The numerals of references refer to the different parts as follows:— 1 indicates the feed roll which is driven through a train of gears to the clutch 2, the clutch 3 being hollow and

having two lugs, 4, projecting inwardly from opposite sides of the member, to engage the fingers, 5, secured on the feed rollers shaft, 1, and thus produce rotation of the latter. It will be seen that by having the lugs, 4, of the clutch member, 3, set in a position farther

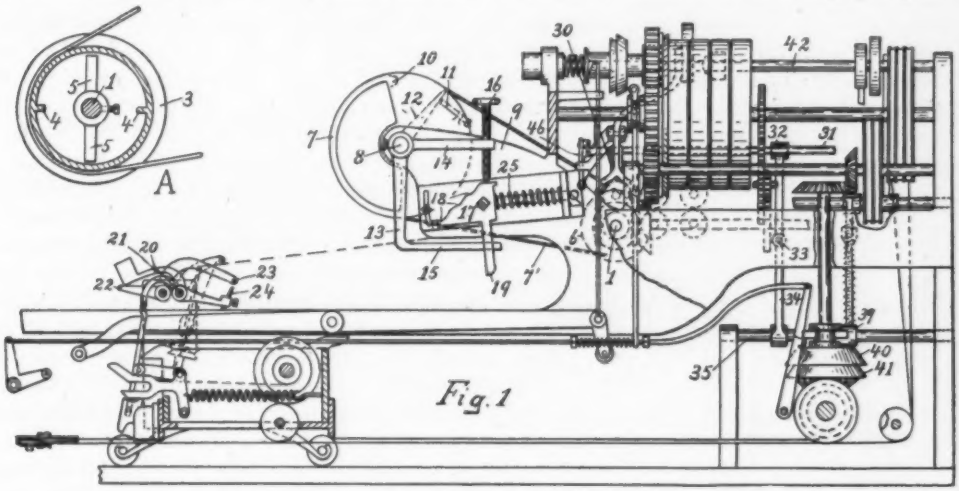


Fig. 1

away from the fingers, 5, when said clutch is rotated by having it thrown in clutch with the other member, 6, the feed roll is not rotated for a correspondingly longer space of time, thus giving time for the slack in the yarn, as produced by the movements of the fallers, to be taken up. The clutch member, 3, is positioned for each run out of the carriage by having a connection with the heavy sided (unbalanced) wheel, 7, by means of a rope, 7', which fits into grooves on each. The wheel 7 is loose on the shaft 8 which is journaled in the part of the framing, 9, said wheel having attached to its side a lug, 10, and a stop screw, 11. Fastened to the shaft 8, is a stop finger, 12, which projects between the lug 10 and the screw 11, and when the member 3 is out of clutch the wheel 7 rotates in the opposite direction until the lug 10 comes against it. On the other end of the shaft 8 is secured a double angled lever, 13, having both ends, 14 and 15, extending horizontally toward the head of the mule. The setting screw, 16, is fitted into the top lever, 14, and has its end resting on the plate 17 when the run in of the carriage is made. The distance that the clutch member is turned back depends upon two items, that is, the distance between the lug, 10, and the end of the screw, 11, and the lowest position that the stop finger 12 can go. In order to have this distance made automatically variable to suit the different conditions of winding, the plate 17 is made use of. It has one side, 18, so shaped that when it is moved backward, the screw 16 will fall lower and hence bring the stop finger 12 lower. On the under side of the plate is attached a projection, 19, and on the carriage of the mule is placed a lever, 20, centered at 21, having the back end which is heavier to rest on a projection 22 of the faller 23, and the other end of said lever 20 has a projection 24, which when the faller rod

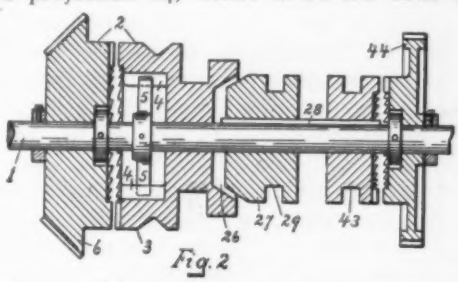


Fig. 2

rises too high, and takes off too much yarn, will strike against the projection 19 as the carriage moves in, and push the plate 17 in, against the spring 25, and when the point of the screw 16 will drop until it strikes the side of 18 of said plate 17. By having the plate rest on a slant, it is only moved backward

as just explained, an amount to correspond with the amount of slack in the yarn.

When the carriage starts out and the clutch 2 is locked, the wheel 3 is rotated and in turn causes the wheel 7 to be rotated until the stop screw 11 comes against the stop finger 12, and raises it, causing the lever 15 to come against the framing 9, when said wheel stops and the rope 7' slips in the groove until the clutch 2 is thrown again out and the member 3 freed. The heavy part of

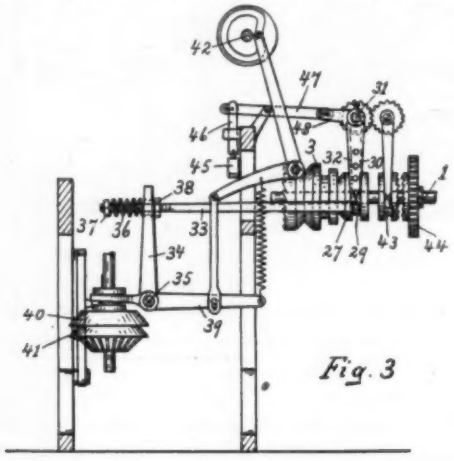


Fig. 3

the wheel 7 causes it to rotate in the opposite direction until the screw 16 rests on the plate 17, thus the lugs 4 on the wheel 3 are positioned through the rope connection with the wheel 7, unless an extra amount of slack is made, when, as mentioned before, the fallers will raise, causing the projection 24 to come against projection 19 and push the plate 17 inward and allowing the screw to fall lower with a corresponding rotation of the lugs 4 from the fingers 5, thus delaying for a longer time the rotation of the feed roll when the carriage starts out. Immediately that the screw 16 is raised on the outward run, the spring 25 pushes the plate 17 out to its original position, to be moved again as the slackness of the yarn requires it. The screw 16 is adjustable, and can be moved by hand, which is done while the cop is building, as then the work is distributed between it and the plate 17.

When the "roller motion while winding" is used, an extra attachment is necessary, as the position of the lugs 4 in relation to the fingers 5 would be changed by the consequent rotation of said fingers on the feed roller shaft 1.

To prevent this relation from being changed after the lugs have been positioned, the clutch member 3 carrying the lugs 4, must rotate in unison with the feed roller shaft 1 during the extra rotation.

The right end of the clutch member 3 is provided with a conical shaped cavity 26, and a clutch sleeve 27, (sliding on key 28 on the feed roller shaft) fits into the cavity 26 and is also provided with a groove 29 in which a forked lever 30 slides. This lever 30 is secured to the horizontal shaft 31, which is fitted in proper bearings and has connected to it near its other end a vertical lever 32, the other end of this lever being in turn connected to the horizontal rod 33. This rod 33 passes loosely through the top end of the vertical lever 34 which is rigidly secured to the rock shaft 35. A spring 36 is arranged on the rod 33 between a nut 37 and the lever 34, and another nut 38 is screwed on the rod 33 on the opposite side of the lever 34 from the spring 36. Attached also to the rock shaft 35 is a lever 39, one end of which controls the clutch 40 and 41, the other end being worked by the cam 42 through the levers shown in connection with Fig. 3. The clutch 40-41 controls the inward run of the carriage.

When the carriage completes its outward run, the clutch member 3 is thrown out and its lugs 4 are then positioned in relation to the fingers 5, as has been previously explained. The cam 42 is then throwing the clutch 40-41 in, rotates the rock shaft 35 and moves the vertical lever 34 in a left hand direction. This movement carries the horizontal rod 33 as well as the vertical rod 32 with it. The rod 32, being connected through the shaft 31 to the lever 30, throws 5, the end of that lever so that the clutch 27 sliding in it will be forced into contact with the clutch member 3, and the clutch 27 being keyed sliding on the feed roller shaft 1 when it is in contact with the clutch 3 will cause it to rotate with the feed roller in unsion. At the same time that the clutches 27 and 3 are thrown in contact, a clutch 43 is also thrown into contact with a clutch member 44 carrying gear teeth, and which is continually rotated through a positive drive,

by a connection not shown. This rotation is given the feed roll on the run in of the carriage and the positions of the lugs 4 to the fingers 5 maintained. When the fallers are raised too high and the plate 17 is pushed back, a wedge shaped head 45 forces bar 46 upward and through the lever 47 and 48 will rotate the shaft 31 and cause the clutches to move out of contact.

THE FINISHING OF CHINCHILLAS.

The manipulation of goods in the producing of chinchilla and similar rough face finishes necessitates some special machinery in a woolen mill. Two methods are employed in the portion of the process before the rubbing, which methods are governed by the supply of the machinery, the grade of goods and time. In the first place, the fabric should be so constructed as to produce the best effects in the finishing. The face yarn (filling) should be of a nature to produce a full nap; the weave should be smooth and the fabric, as a whole, have no stiffness, but rather a tendency towards sponginess. If the previous processes have been intelligently manipulated, the fulling (which should be of a short duration), will leave the goods well filled, yet with an absence of hardness or stiffness.

After fulling and washing, the fabric must be freed from wrinkles so as to avoid any appearance of streaks due to gigging. Gig thoroughly. Should the conditions admit of it, the piece should be cropped, the nap straightened and then dried. After drying, the nap should be softened up, and the fabric then sheared. In the latter process, instead of the ordinary raising brush, a wire brush is substituted which more thoroughly and evenly raises the nap. When the required closeness of shearing has been attained, one or two runs are given with laying brush off, after which the fabric is ready for the chinchilla machine, a machine having an oblong surface about two feet wide by five feet long placed in a frame about three feet from the floor, over which the fabric passes very slowly face upward. Over this is a strong cast iron "follower" of about the same size and shape of the "bed" through each end of which an upright shaft passes, which is movable up and down, by means of a handle. On the under side of this "follower" is a plate of solid rubber securely fastened to it, which, on being lowered, rests on the face of the cloth. On the upright shaft is a mechanism for producing a rotary motion to the follower which rubs on the cloth, twisting the nap into spiral points. Other mechanisms are also provided to transform the rotary to a reciprocal motion, either forward or backward, from side to side, or diagonally. The upright shafts are geared to the main shaft which passes through the lower part of the machine, and which receives motion from the main or counter shaft by means of a belt. The rotary mechanism is capable of being increased or diminished, thereby varying the "sweep."

The setting of the machine is, like the rest of the different processes of finishing, dependent more on judgment than upon any arbitrary rule that can be advanced as sure, but the amount of "sweep" should not be excessive. The pressure of the "follower" on the cloth is also a matter on which judgement must be exercised. It is also important that the rubbing material be kept free from any tendency to gum up and glaze. The surface of the rubber must be also absolutely true, if not true, it may be due to the wood which forms the back being warped, which if the case, the rubber must be removed and the surface planed. The same also applies to the bottom surface which is covered with a good grade of brussels or velvet carpet. All tendency on the part of the "follower" to depart from the motion required to produce the finish and effect should be reduced to a minimum, such as when a "Whitney" finish is being produced, the tendency to describe a round motion should be checked, and the motion be directed in a straight line. The same with the "Petersham" or round motion, the motion should be round and not elliptic. The speed of the main shaft of the machine should be not over 145 turns a minute, which will produce a speed of the rubber of about 500 turns.

IMPROVED NEEDLE OPERATING MECHANISM FOR KNOWLES LAPPET LOOMS.

The gist of the improvement consists in providing means whereby the range as well as variety of movement of the needle bars in a lappet loom are greatly increased, with the result that a larger range of patterns can be woven than heretofore possible.

In the new mechanism two pattern surfaces are provided, each having varying heights and a separate lever which through a joint connection operates the needle bar, having thereon the needles which carry the lappet threads, longitudinally in the loom.

The movement of either lever or both levers, by the action of their respective pattern surfaces will communicate a longitudinal movement to the needle-bar, thus placing the needles carrying the lappet warp threads in varying positions over the sheds of the regular weaving warp threads and thus interweave said lappet warp threads on the surface of the fabric so as to produce the desired design. Different elevations of the two pattern surfaces are generally used to produce any desired figure by the resultant movement of the needle bar. One of the pattern surfaces for operating its respective lever, may be provided for several successive picks or movements of the pattern surface with elevation of the same height, so that the lever will remain at rest, while the other pattern surface, which operates the other lever, may have elevations of varying heights, so that the movement of the needle-bar will be governed only by the lever of the latter pattern surface. Again the two pattern surfaces may be provided with elevations of varying heights, and when in turn the two levers of said pattern surfaces will act, through the connection to the needle bar, to communicate to said needle bar movement equal to the combination of movements produced by each of said levers, a feature, which as mentioned before is the object of the improvement.

In order to give this increased movement to the needle bar over that produced by the movement of one lever only, the needle bar is flexibly connected to both levers by having the connection which is fastened to the top lever, extend down and around a pulley secured on the bottom lever, then up again, over a pulley situated on the lay, and connected to the needle bar. The movement of the pulley on the lower lever in the loop of the connection, by means of combined action of both levers in this instance, produces the increased movement of the needle bar over that produced when only using one lever.

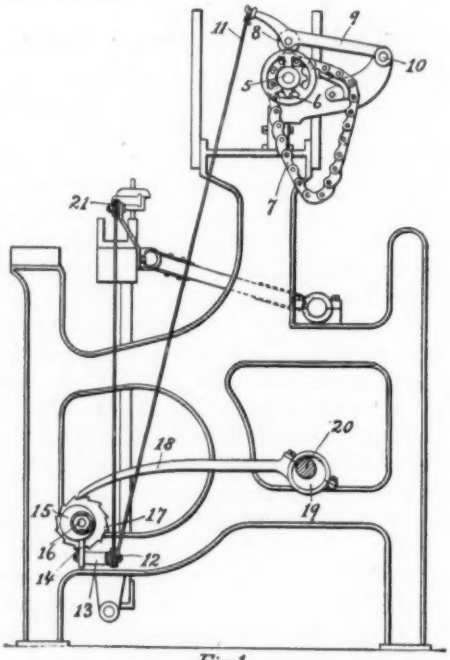


Fig1

Of the accompanying illustrations Fig. 1 is an end elevation of a loom-frame and lay showing the improvements applied. Fig. 2 is a plan view of a portion of the loom-frame and lay the needle bar and connections, detached from the loom.

A description of the construction and operation of the new mechanism is best given by quoting numerals of references accompanying our illustration and of which 1 indicates the needle bar, which carries the clamps 2, holding the lappet thread needles, said needle bar 1 sliding longitudinally in the slides 3. To one end of the needle bar 1 is attached a spring 4, also fastened to the loom, which acts to pull the needle bar back

toward its original position after having been pulled in the opposite direction by the connection, later on to be described, at the other end. The mechanism by which the needle bar is raised and lowered in order to weave the lappet threads into the cloth, is not shown in the figures as the connection is the same as for ordinary lappet looms. The

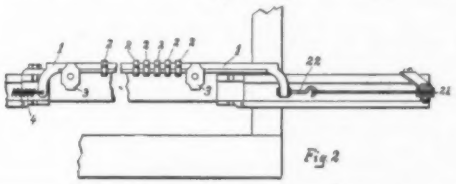


Fig 2

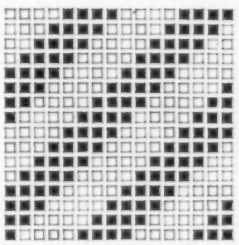
connections of the pattern surfaces to produce the desired pattern on the cloth are given as follows: On the shaft 5, which is driven by means of suitable connections with gearing on the loom, is fixed the pattern chain cylinder 6, and carrying the pattern chain 7, which is composed of links of varying heights. Resting on the pattern chain directly over the chain cylinder is a bowl 8, carried by the lever 9, which has one end pivoted on the pin 10, the other end being connected to a flexible connection 11. This connection 11, extends downward to a pulley 12, situated on one end of the angle lever 13, said angle lever being pivoted at its other end to a projection on the loom frame, and carries a plate 14, near the central angle in its length. Directly above this plate 14, is a cam 15, fixed on the shaft 16, said shaft being properly set in bearings and also carrying the rachet wheel 17. This rachet wheel is rotated by means of the pawl 18, which receives its reciprocating motion from the eccentric 19, fast on the bottom shaft 20, to which it is connected. Through the rotation of the rachet wheel 17, the cam 15 is also revolved, and being in contact with the plate 14, on the lever 17, presses the lever down according to the outline of the cam, and hence the pulley 12, is also moved downward.

As stated before, the connection from the top lever is passed under this pulley and up to the pulley 21 on the lay of the loom, in turn passing over the pulley and being connected to the needle bar 1, through the link 22, so that any movement of the connection 11 will be transmitted to the needle bar 1.

Hence we have two pattern surfaces, viz., the pattern chain, and the cam, the levers which are operated by them being connected to the needle bar by the flexible connection 11. A movement of either lever or both will cause the needle bar 1, to be pulled outward after which the spring 4, on the other end of said needle bar will bring it back into position and also hold the levers 9 and 13 in contact with their pattern surfaces. To illustrate the variation which may be obtained by the use of two pattern surfaces, let us take a concrete example. Suppose the bottom lever is pressed down half an inch by the cam, and the position of the top lever is not disturbed, then through the connection 11 previously described, the needle bar will be moved outward half an inch. Now suppose that at the same time the lower lever is moved down, the top lever is raised by the chain, then the combined movement of the levers will be transmitted through the flexible connection to the needle bar.

NOVELTIES FROM FOREIGN SOURCES.

Woolen Cheviot Suiting.



Complete Weave.

Repeat 8 × 8.

Warp:—2,240 ends, 8 or 16 harness straight draw, all 4 run woolen yarn.

Reed:—8 × 4 = 70 inches wide.

Dress:—

12 ends, gray.
2 ends, black.
1 end, crimson.
1 end, black.

16 ends repeat of dressing.

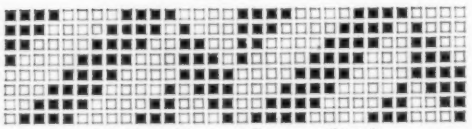
Filling:—32 picks per inch, all 4 run woolen yarn, arranged thus:

12 picks, black.
2 picks, gray.
1 pick, blue.
1 pick, gray.

16 picks repeat of pattern.

Finish:—Woolen cheviot finish; scour well, clip on shear; 56 inches finished width.

Worsted Trousering.



Complete Weave. Repeat 16 × 8.

Warp:—3,328 ends, 16 harness straight draw, all 2/20's worsted yarn.

Reed:—13 × 4 = 64 inches wide.

Dress:—

4 ends, black.
4 ends, dark blue.
4 ends, black.
1 end, coffee brown.
2 ends, dark blue.
1 end, coffee brown.

16 ends repeat of dressing.

Filling:—50 picks per inch, all 2/20's black worsted.

Finish:—Worsted finish; 56 inches finished width.

Woolen Cheviot Suiting.

Complete Weave.
Repeat 4 × 4.

Warp:—1,740 ends, all 2 ply, 6 run twist, 8 harness straight draw.

Reed:—13½ × 2 = 64 inches wide.

Dress:—

3 ends, dark green	=	3 ends
1 end, medium gray 1 end, black	× 11	= 22 ends
1 end, medium gray	=	1 end
3 ends, black	=	3 ends
1 end, medium gray 1 end, black	× 11	= 22 ends
1 end, medium gray	=	1 end

Repeat of pattern: 52 ends

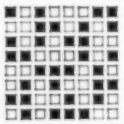
Filling:—28 picks per inch, arranged thus:

3 picks, 2 ply, 6 run black and green twist.
63 picks, 2 ply, 6 run all black twist.

66 picks in repeat of pattern.

Finish:—Woolen cheviot finish; scour well, clip on shear; 56 inches wide.

Worsted Suiting.



Complete Weave.
Repeat 8 × 8.

Warp:—4,680 ends, all 2/48's worsted, 16-harness, straight draw.

Reed:—18½ × 4 = 64 inches wide.

Dress:—

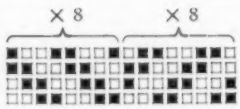
1 end, white
3 ends, black.

4 ends repeat of pattern.

Filling:—70 picks per inch, all 2/48's worsted, black.

Finish:—Worsted finish; 56 inches wide.

Fancy Woolen Cheviot Trousering.



Complete Weave.
Repeat 128 × 4.

Warp:—2,272 ends, 16-harness fancy draw.

Reed:—9 × 4 = 63 inches wide.

Dress:—

1 end, 3½ run black 1 end, 2/6½ run white	× 10	= 20 ends
1 end, 2/6½ run blue	=	1 end
1 end, 2/6½ run white	=	1 end
1 end, 3½ run black	=	1 end
1 end, 2/6½ run white	=	1 end
1 end, 2/6½ run yellow	=	1 end
1 end, 2/6½ run white	=	1 end
1 end, 3½ run black	=	1 end
1 end, 2/6½ run white	=	1 end
1 end, 2/6½ run blue	=	1 end
1 end, 2/6½ run white 1 end, 3½ run black	× 11	= 22 ends
1 end, 2/6½ run white	=	1 end
1 end, 2/6½ run red	=	1 end
1 end, 2/6½ run white 1 end, 3½ run black	× 3	= 6 ends
1 end, 2/6½ run white	=	1 end
1 end, 2/6½ run red	=	1 end
1 end, 2/6½ run white	=	1 end
1 end, 3½ run black	=	1 end
1 end, 2/6½ run white	=	1 end

Repeat of pattern: 64 ends

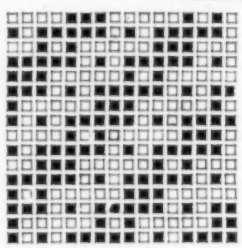
Filling:—40 picks per inch, arranged thus:

1 pick, 2/6½ run black and white twist.
1 pick, 3½ run black.

2 picks in repeat of pattern.

Finish:—Woolen cheviot finish; scour well, clip on shear, 56 inches wide.

Worsted Cheviot Suiting.



Complete Weave.
Repeat 16× 16.

Warp:—5,800 ends.

Reed:—15 × 6 = 64½ inches wide in loom.

Dress:—

2 ends, 2/40's cheviot, black, twisted with 2/80's mercerized cotton, white	=	2 ends.
6 ends, 2/40's cheviot worsted, black	=	6 ends.
2 ends, 2/40's cheviot, black, twisted with 2/80's mercerized cotton, white	=	2 ends.
34 ends, 2/40's cheviot worsted, black	=	34 ends.
2 ends, 2/52's worsted, black and blue twist	=	2 ends.
6 ends, 2/40's cheviot worsted, black	=	6 ends.
2 ends, 2/52's worsted, black and green twist	=	2 ends.
34 ends, 2/40's cheviot worsted, black	=	34 ends.

Repeat of pattern: 88 ends.

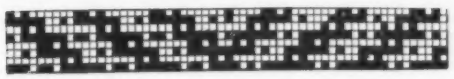
Filling:—100 picks per inch, arranged thus:—

2 picks, 2/52's worsted, black and blue twist.
110 picks, single 20's cheviot, black.

112 picks, repeat of pattern.

Finish:—Cheviot worsted finish.

Fancy Woolen Overcoating.



Complete Weave. Repeat 60 × 8.

Warp:—5,250 ends, 10 harness fancy draw.

Reed:—15 × 5 = 70 inches wide.

Dress:—

1 end, 4 run black and 64's worsted, white twist 1 end, 2/52's worsted, black and white twist.... 1 end, 4 run white and 64's worsted, white twist 2 ends, 4 run black	× 4 = 20 ends
1 end, 4 run black and 64's worsted, white twist 1 end, 4 run black 1 end, 4 run black and 64's worsted, white twist 2 ends, 4 run black	× 8 = 40 ends
1 end, 4 run black and 64's worsted, white twist 1 end, 2/52's worsted, black and white twist.... 1 end, 4 run black and 64's worsted, white twist 2 ends, 4 run black	× 2 = 10 ends
1 end, 4 run black and 64's worsted, white twist 1 end, 4 run black 1 end, 4 run black and 64's worsted, white twist 2 ends, 4 run black	× 22 = 110 ends
	Repeat of pattern: 180 ends

Filling:—63 picks per inch, arranged thus:—

1 pick, 4 run black 1 pick, 2/52's worsted, black and white twist 2 picks, 4 run black	× 4 = 16 picks
40 picks, 4 run black	= 40 picks
1 pick, 4 run back 1 pick, 2/52's worsted, black and white twist 2 picks, 4 run black	× 28 = 112 picks
	Repeat of pattern: 168 picks

Finish:—Scour well, full slightly, clip on shear; 56 inches finished width.

Woolen Cheviot Suiting.

Complete Weave.
Repeat 4 × 4.

Warp:—1,875 ends.

Reed:—15 × 2 = 62½ inches wide in loom.

Dress:—

3 ends, 2/16's worsted cheviot, black and white twist....	= 3 ends.
1 end, 2/16's worsted cheviot, black twist.....	= 1 end.
1 end, 2/16's worsted cheviot, brown and yellow twist..	= 1 end.
1 end, 2/16's worsted cheviot, blue twist.....	= 1 end.
1 end, 2/16's worsted cheviot, brown and yellow twist..	= 1 end.
1 end, 2/16's worsted cheviot, black twist.....	= 1 end.
1 end, 2/16's worsted cheviot, black and white twist 1 end, 2/16's worsted cheviot, black twist..... 1 end, 2/16's worsted cheviot, white and green twist..... 1 end, 2/16's worsted cheviot, black twist.....	× 2 = 8 ends.
1 end, 2/16's worsted cheviot, brown and yellow twist..... 1 end, 2/16's worsted cheviot, black twist.....	× 4 = 8 ends.
1 end, 2/16's worsted cheviot, black and white twist....	= 1 end.
1 end, 2/16's worsted cheviot, black twist.....	= 1 end.
1 end, 2/16's worsted cheviot, white and green twist....	= 1 end.
1 end, 2/16's worsted cheviot, black	= 1 end.
1 end, 2/16's worsted cheviot, black and white twist....	= 1 end.
1 end, 2/16's worsted cheviot, black	= 1 end.
1 end, 2/16's worsted cheviot, white and green twist....	= 1 end.
1 end, 2/16's worsted cheviot, blue twist.....	= 1 end.
	Repeat of pattern: 32 ends.

Filling:—37 picks per inch, 3½ run woolen yarn, dark blue.

Finish:—Worsted finish, scour well, shear clear, 56 inches wide.

Fancy Cassimere.

Complete Weave.
Repeat 6 × 6.

Warp:—2,430 ends.

Reed:—12½ × 3 = 65 inches wide in loom.

Dress:—

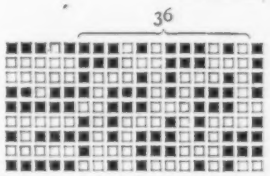
1 end, 2-ply 6-run, blue twist.....	= 1 end.
2 ends, 3-run, olive	= 2 ends.
1 end, 2-ply 6-run, gray twist.....	= 1 end.
2 ends, 3-run, olive.....	× 3 = 9 ends.
1 end 2-ply 6-run, white twist.....	
2 ends, 3-run, olive.....	× 3 = 9 ends.
1 end, 2-ply 6-run, gray twist.....	
2 ends, 3-run, olive.....	× 3 = 9 ends.
1 end, 2-ply 6-run, white twist.....	
2 ends, 3-run, olive	= 2 ends.
1 end, 2-ply 6-run, gray twist	= 1 end.
2 ends, 3-run, olive	= 2 ends.
1 end, 3-run, brown	= 1 end.
2 ends, 3-run, olive	= 2 ends.
1 end, 2-ply 6 run, gray twist	= 1 end.
2 ends, 3-run, olive.....	× 3 = 9 ends.
1 end, 2-ply 6-run, white twist	
2 ends, 3-run, olive	× 3 = 9 ends.
1 end, 2-ply 6-run, gray twist.....	
2 ends, 3-run, olive.....	× 3 = 9 ends.
1 end, 2-ply 6-run, white twist	
2 ends, 3-run, olive	= 2 ends.
1 end, 2-ply 6-run, gray twist	= 1 end.
2 ends, 3-run, olive	= 2 ends.
	Repeat of pattern: 72 ends.

Filling:—42 picks per inch, arranged thus:—

1 pick, 2-ply 6-run twist, blue.....	= 1 pick.
2 picks, 3-run, black	
1 pick, 2-ply 6-run, black and pearl twist.....	× 31 = 93 picks.
2 picks, 3-run, black	= 2 picks.
	Repeat of pattern: 96 picks.

Finish:—Cheviot finish, scour well, shear clear, 56 inches wide.

Worsted Trousering.



Complete Weave.
Repeat 42 × 9.

Warp:—7,672 ends.

Reed:—20 { 1 dent @ 5 = 5 ends; 5 dents @ 6 = 30 ends; 1 dent @ 7 = 7 ends } = 64 inches wide.

7 dents to 42 ends

Dress:—

5 ends, 2/64's worsted, black	= 5 ends.
1 end, 2/64's worsted, black, twisted with 2/80's cotton, white	= 1 end.
1 end, 2/64's worsted, black and white twist.....	= 1 end.
16 ends, 2/64's worsted, black	= 16 ends.
2 ends, 2/64's worsted, black and blue-green twist.....	= 2 ends.
15 ends, 2/64's worsted, black	= 15 ends.
1 end, 2/64's worsted, black and white twist.....	= 1 end.
1 end, 2/64's worsted, black, twisted with 2/80's cotton, white	= 1 end.
	Repeat of pattern: 42 ends

Filling:—87 picks per inch, arranged thus:—

2 picks, 2/64's worsted, black.
1 pick, 3⅛ run woolen yarn.

3 picks, repeat of pattern.

Finish:—Worsted finish, scour well, shear clear, 56 inches wide.

OUR TEXTILE DESIGN SCHOOL.

LESSON 2. — RIB AND BASKET WEAVES.

Having given in our previous lesson, a thorough explanation of the plain, twill and satin weaves, i. e., the foundation for our weaves for textile designing, we now come to the "Derivative Weaves," i. e., weaves obtained from either the plain, twill or satin weaves, being weaves having one or the other of the foundation weaves for their basis of construction. For the present lesson we will take the plain weave for our foundation, constructing in turn from this weave one of the most important subdivisions of weaves, i. e., rib and basket weaves. Although both systems have the identical foundation, yet they vary vastly in their practical application to woven fabrics, since in rib weaves either the warp or the filling only forms the face and back of the structure, the other system of threads, warp or filling, as the case may be, thus not used, resting imbedded, between the other system of threads, in the centre of the structure.

This feature of using only one system of threads in rib weaves for producing the face of the fabric, naturally requires a high texture to be used for that system of threads as thus produce the face alone. This feature does not apply to basket weaves since in that instance both systems of threads, warp and filling, form face and back at the same time. This difference in the construction of these two systems of weaves, with reference to practical work in a mill, naturally compels us to consider them separately.

RIB WEAVES.

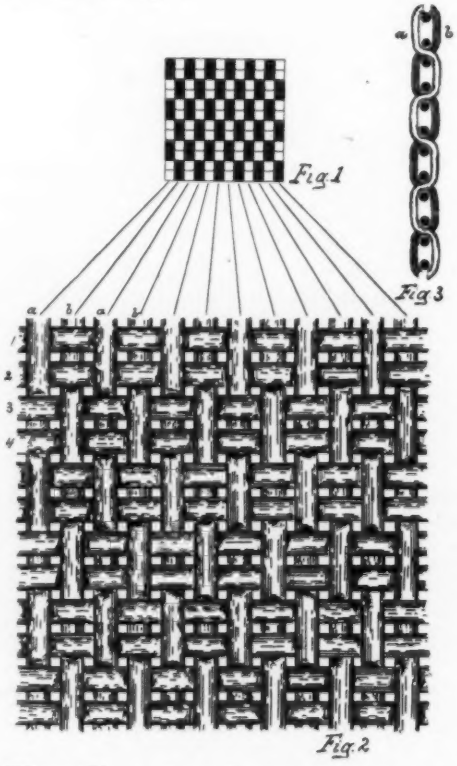
This name is derived from the characteristic rib lines they produce in the fabric, said lines running either warp or filling ways according to either filling or warp producing the face of the fabric, and for which reason we will divide rib weaves respectively into warp or filling effect rib weaves.

WARP EFFECTS.

The principal object in constructing these weaves is to introduce more than one pick in succession in the same shed of a regular plain weave. This subdivision of these weaves again can be divided into plain or fancy effects accordingly whether we will introduce either the same number of picks regularly into a shed, or vary the number of picks thus introduced, in turn producing for the plain effects ribs of equal size, whereas for fancy effects, and where the number of picks introduced into the plain weave is varied, the size of the different rib lines in the fabric will correspondingly vary also.

PLAIN, WARP EFFECT RIB WEAVES.

The first weave of this kind is produced by means of introducing two picks in succession into the plain weave, a feature readily explained by means of weave Fig. 1 and its diagram of a woven fabric Fig. 2.



Weave Fig. 1 shows 6 repeats warp ways and 3 repeats filling ways of this rib weave, the actual (one repeat) weave repeating on 2 × 4, requiring for its execution on the loom two harnesses for its lowest number, although in practical work 4 or more harnesses will be used.

Diagram Fig. 2 clearly shows the interlacings

of warp and filling in connection with this weave, the respective lines between the warp threads in the weave as well as in the fabric guiding the eye for this purpose. A feature impossible to be shown in the diagram but which must be remembered by the student, is the fact that the warp threads as shown spread apart in said diagram will in the woven fabric be pushed up close together; every alternate warp thread as floating over or under two picks, forming respectively either face or back of the structure. By this we mean that warp threads indicated by *a* in diagram, i. e., every uneven numbered warp thread will join on picks indicated by 1 and 2 and thus form the face of the structure at that time, warp threads indicated by *b* forming at that moment the back of the structure. This arrangement is completely reversed with reference to picks 3 and 4 and when in that instance warp threads indicated by *b*, will form the face of the structure (said warp threads resting then closely side by side on the face of the fabric) warp threads *a* at that time forming the back. The filling, as now visible in the diagram, shown thus for the sake of illustrating the interlacings of the threads, will not be visible in the woven fabric.

refers to a section of woven fabric Fig. 2, cut in the direction of the warp.

Fig. 4 shows this plain warp effect rib weave (2 × 4) executed on point paper, being especially given for the purpose to bring a complete history of rib weaves within the grasp of the student, compiled on one sheet of diagrams of weaves, handy for future use for reference.

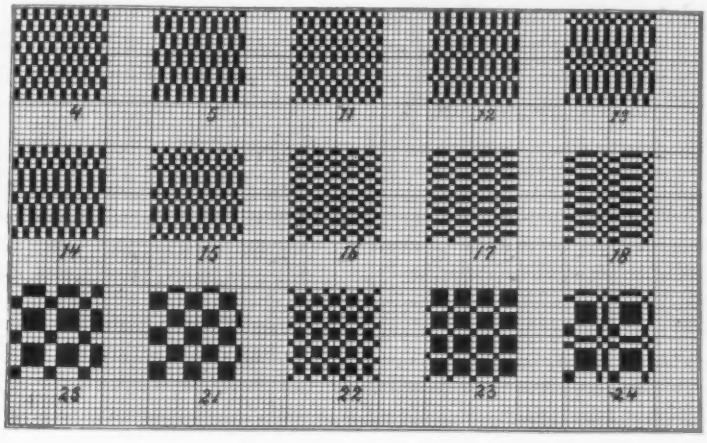
Weave Fig. 5 shows the plain warp effect rib weave having three picks in a shed, repeating on 2 × 6.

In the same manner as thus using either two or three picks in a shed, four or more picks might be used, a feature, however, rarely resorted to in practical work.

PLAIN FILLING EFFECT RIB WEAVES.

The construction of these weaves and their application to woven cloth is readily explained by means of diagrams 6 and 7.

Weave Fig. 6 shows the plain filling effect rib weave, having two warp threads working alike, the filling in this instance forming both the face and back of the structure, the warp resting imbedded between. Lines connecting diagrams 6 and 7, are given to the respective warp threads in weave and fabric. Every point



In diagram Fig. 3 a section of a fabric interlaced with weave Fig. 1 is given, showing the warp threads *a* and *b* respectively in outline and shaded; the section of the picks being shown in full black circles, a feature which will readily demonstrate to the student that diagram Fig. 3

mentioned before, with reference to warp, in connection with diagrams Figs. 1 to 5, refers to filling in diagrams 6 and 7 and vice versa. The repeat of weave of Fig. 6 is 4 × 6.

In the same manner as in connection with weave Fig. 6, using two warp threads to work

alike, we can arrange 3, 4 or more warp threads to work in this manner, in turn increasing the repeat of the weave warp-ways as well as the size of the rib line effect in the fabric (which in this instance runs in the direction of the warp). This one example of the plain rib weave effect, will suffice for others.

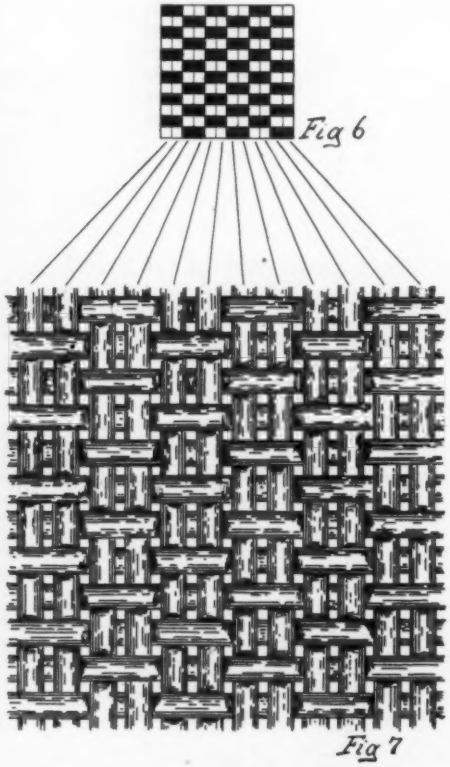


Fig 6

Fig 7

FANCY WARP EFFECT RIB WEAVES

are produced by varying the number of picks in a shed, in turn producing narrow and wider rib lines (in the direction of the filling) in the structure. In order to explain the subject more in detail, the accompanying diagrams 8, 9 and 10 as well as weaves 11 to 15, are given.

Weave Fig. 8 illustrates the fancy warp effect rib weave, produced with the exchanging of $\frac{1}{3}$, i.e., one pick in one shed of the plain weave to alternate with one pick of said weave having two picks in its shed. Repeat of weave 2 × 3.

Diagram Fig. 9 (as mentioned before), is the fabric constructed with weave Fig. 8, the lines between weave and fabric being given to guide the student with reference to the respective warp threads.

Diagram Fig. 10, is a section of a fabric shown in Fig. 9, the latter being cut in the direction of the warp for this purpose. Warp threads are indicated by *a* and *b* respectively in outline and shaded, the section of the filling threads being shown by full black circles.

Diagram Fig. 11 shows weave fabric 9 executed on regular point paper, the weave repeating 2 × 3.

Weave Fig. 12 is another fancy warp effect rib weave, being constructed with the exchange of $\frac{1}{3}$ and $\frac{3}{1}$ respectively for every alternate warp thread, i.e., one pick in one shed of the plain weave to alternate with three picks in the other shed of said plain weave. Repeat of weave 2× 4.

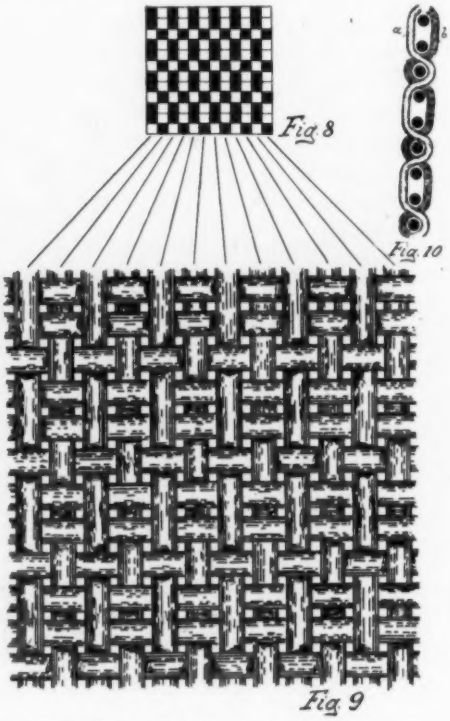


Fig 8

Fig 10

Fig 9

Weave Fig 13 has for its foundation:

2 picks in one shed.....
4 picks in the next shed...
1 pick in the next shed...
1 pick in the next shed...
} in 2 repeats of the plain weave, the weave thus given repeating on 2 × 8.

Another fancy warp effect rib weave is given by means of diagram Fig. 14, having for its

basis of construction, two picks in one shed, to alternate with four picks in the other shed, of the common plain weave. Repeat 2 × 6.

Weave Fig. 15 shows still another fancy effect rib weave, having for its basis of construction $\frac{1}{2}\frac{3}{1}\frac{2}{3}$, repeating on 2 × 12.

These 5 examples thus given will readily explain to the student how to construct any fancy warp effect rib weaves, no matter what fabric he may deal with.

FANCY FILLING EFFECT RIB WEAVES.

Their construction is closely related to the previously referred to system of weaves, the only difference being that what previously referred to warp, refers in this instance to the filling and vice versa. For this reason only three examples have been quoted on our plate of weaves, viz.:

Weave Fig. 16 which has for its basis of construction $\frac{1}{2}$ and repeats on 3 × 2.

Weave Fig. 17 has for its foundation $\frac{1}{3}$, being a more prominent affair compared to the previously quoted weave.

Weave Fig. 18 is a more elaborate weave, having for its basis of construction $\frac{2}{4}\frac{1}{1}$ and repeats on 8 × 2.

In either case, with reference to weave Figs. 16, 17 and 18, the rib lines in the fabric run in the direction of the warp.

BASKET WEAVES.

These weaves are divided into plain and fancy effects and are obtained from the plain weave by working two or wore warp threads alike and two or more picks in the same shed. With reference to a technical definition, they are a combination of the respective rib weaves, warp and filling effects combined. In this system of weaves, as previously mentioned, warp and filling form portions of the face and back of the fabric and thus are of a totally different character with reference to cloth construction, than compared to rib weaves, where only one system is used for interlacing face and back of the structure.

PLAIN BASKET WEAVES.

These are readily explained by means of diagram and weaves Figs. 19, 20 and 21, and of which weave Fig. 19 is the common $\frac{2}{2}$ four harness basket weave.

Diagram Fig. 20 shows the fabric structure to this weave.

Weave Fig. 21 is the common $\frac{3}{3}$ six harness basket, being obtained by working three warp threads alike and inserting three picks in one shed.

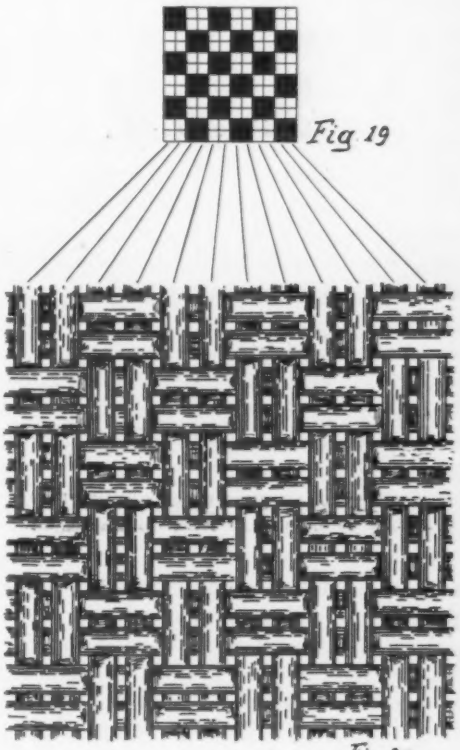


Fig 19

Fig. 20

Having thus given an explanation of the common basket weaves, we will in turn take up the

FANCY BASKET WEAVES,

a system of weaves readily explained by means of diagram Figs. 22, 23, 24 and 25.

Weave 22 shows the fancy basket weave having for its foundation $\frac{1}{2}$ and repeating on 3 × 3.

Weave Fig. 23 has for its foundation $\frac{1}{3}$, repeating on 4 × 4.

Weave Fig. 24 has for its foundation $\frac{2}{4}\frac{1}{1}$, repeating on 8 × 8.

Weave Fig. 25 has for its foundation $\frac{2}{4}$, repeating on 6 × 6.

Considering weave Fig. 22, the same is a combination of weaves Figs. 11 and 16; weave

Fig. 23, being a combination of weaves Figs. 12 and 17; and finally weave Fig. 24, a combination of weaves Figs. 13 and 18.

Examples thus given will readily explain to the student how to construct any fancy rib or basket weave he ever will come in contact with, for which reason we will now call the student's attention to figuring with these rib weaves, an affair which may be done for various purposes.

RIB WEAVES WITH INTERWOVEN BACK.

The construction of these weaves is readily explained by means of weaves Figs. 26 and 27.

Weave Fig. 26 shows by means of ■ the common $\frac{6}{6}$ rib weave, warp effect This means that in this instance six picks are to be introduced into each shed of the plain weave, a feature which very readily will result in a loose structure, i.e., the fabric will not have enough body and for which reason more interlacing of the warp and filling has to be done, a feature readily accomplished in connection with weave Fig. 26, by interlacing the warp threads which float on the back of the structure, into the structure. (See ⊠).

Weave Fig. 27 has for its foundation the fancy rib weave warp effect (see ■) in order to strengthen this structure, especially where six picks are introduced into the same shed (⊠) the warp threads when floating on the back to interlace twice (in one repeat of the weave) in the structure, in this instance giving the fabric more strength.

These two examples thus given will readily explain how to proceed with any warp effect rib weave, where warp and filling interlace in the structure in too loose a manner.

HOW TO STITCH WARP THREADS IN A FILLING RIB EFFECT,

in order to get a float effect in the fabric, is readily explained by means of diagrams Figs. 28, 29 and 30.

In these fabrics, especially in connection with worsted trouserings, it is of the greatest importance that these rib lines receive a flat effect. If we would work 2, 3 or more warp threads alike and in the same dent, such threads would naturally roll over each other, thus giving to the fabric a coarser appearance. To prevent this, we have to separate the various warp threads as forming each rib effect, by means of stitching them now and then to the body structure.

Weave Fig. 28 which has for its foundation the $\frac{4}{4}$ (see ■) rib weave, has its warp threads (see ⊡) stitched to the structure, i. e. the two centre threads in each rib by means of the plain weave on every other pick.

Weave Fig. 29 has for its foundation $\frac{5}{3}$ rib weave, having its three centre threads (⊡) stitched to the structure, by means of the three harness twill.

Weave Fig. 30 has for its foundation the $\frac{4}{4}$ rib weave filling effect and has every one of its warp threads stitched to the body of the structure of the fabric by means of the four harness twill.

ADDING SPECIAL WARP THREADS TO STRENGTHEN THE FABRIC,

is frequently made use of in rib fabrics, especially in silk, and is readily explained by means of weave Figs. 31, 32 and 33.

Weave Fig. 31 has for its foundation the $\frac{4}{4}$ rib weave warp effect. (See ■).

In order to increase the strength or stiffness of the fabric, there are introduced between each thread of the warp an extra thread, and which thread will not be visible in the woven fabric, since as mentioned before, warp floats will join warp floats on face and back of the structure and thus hide the threads of the strengthening warp on either side of the fabric.

Weave Fig. 32 has the same common rib warp effect foundation as the weaves before quoted, only that in this instance two ends face and back, alternate with one strengthening warp thread, the latter interlacing on the common plain weave. Repeat of the new weave is 6×8.

Weave Fig. 33 shows a still further variety of these rib weaves. The same rib weave as quoted in the two examples above is used, however we find that in the present arrangement 3 end face warp alternate with 1 end of the strengthening warp. Repeat of weave 8×8.

FIGURED RIB WEAVES.

These weaves are produced in warp or filling effects, or a combination of both. With reference to warp effects, weaves Fig. 34, 35 and 36 will readily explain the subject.

Weave Fig. 34 has for its foundation the $^{3}_{T}$ fancy rib weave, warp effect, having the portion of one pick in the shed, arranged in sections of four threads (spotting see ⊠ type), to alternate after the "plain" setting for motive.

Weave Fig. 35 shows a more elaborate execution of a similar weave, having for its foundation the $^{4}_{T}$ rib weave warp effect. The spotting in this instance (see ⊠) is done in connection with six warp threads after the "plain" setting for motive. Repeat of weave 12 × 6.

Weave Fig. 36 shows a still more elaborate spotting on a rib weave, resulting in this instance more in what we may call a "granite effect," i. e., all broken up effect, since in this instance the plain weave in its pure state for 8 warp threads × 3 picks greatly influences the general appearance of the rib fabric.

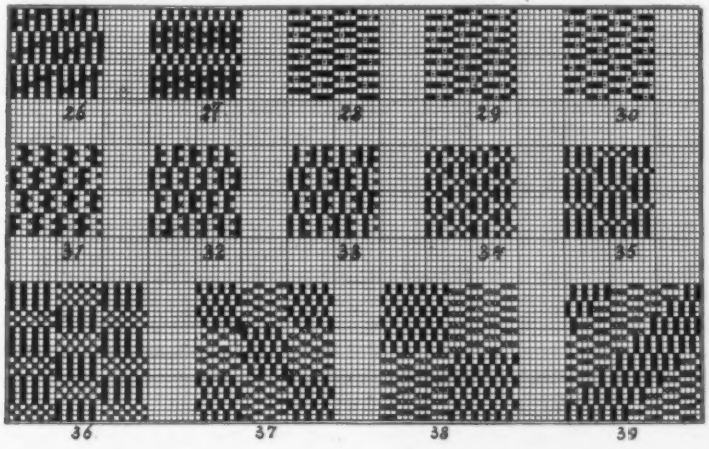
WARP AND FILLING EFFECT COMBINATIONS.

For explaining this affair, weaves Figs. 37, 38 and 39 are given.

Weave 37 is a combination of the $^{2}_{T}$ four harness rib weave warp effect in connection with the corresponding weave filling effect; each effect being used respectively for 8 warp threads and 8 picks, the new weave repeating on 16 × 16.

Weave Fig. 38 shows the combination of two distinct rib weaves used respectively for warp and filling effect. The weaves selected in this instance are the $^{2}_{T}$ 2 × 4 rib weave warp effect for 12 warp threads and 12 picks to alternate with the same number of warp threads and picks of the $^{2}_{T}$ 6 × 2 rib weave filling effect.

Weave Fig. 39 shows the diagonal arrangement of the $^{2}_{T}$ 2 × 6 rib weave warp effect to alternate with the corresponding filling effect of this weave. Repeat of weave 24 × 24.



CORDED EFFECTS.

These effects are used extensivcly in the manufacture of upholstery, cloakings, cotton vestings, etc., and are readily explained by means of Figs. 40, 42, 44 and 46. The object in every instance is to have two kinds of warp and filling, i. e., a binder warp which strictly weaves on one harness $^{1}_{T}$ all the way through the fabric, and a figure warp or face warp which weaves just the reverse to the binder warp. The binder warp is a fine warp, whereas the figure warp is of a coarser count or very likely two threads being used for one.

In the same way as using two counts of warp threads, two different counts of filling are used, viz.: One fine pick to alternate with one coarse pick, thus producing or giving the rib effect to the fabric. The object in designing is to float the figure warp in place of interlacing it with the binder filling, according to a given motive, which in connection with weave Fig. 40, is the five leaf satin.

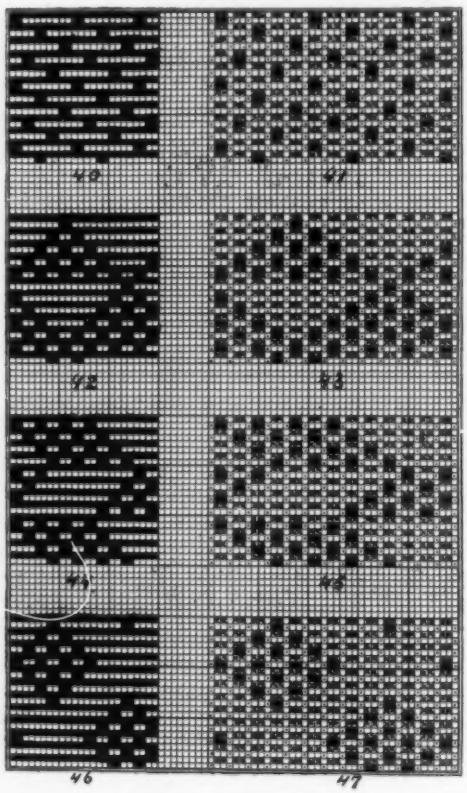
Diagram Fig. 41 is an analysis of the woven structure. ⊡ shows binder warp, weaving $^{1}_{T}$ and being in the upper shed whenever the binder filling goes in. ⊠ indicates the figure warp,

using in this instance, two warp threads in place of one. This figure warp is always up when the heavy pick goes in, and down when the binder filling pick goes in, with the exception of (see ■ type) such places where said figure warp has to float over the binder pick in order to produce the requisite figure by means of said floating, the same as mentioned before being distributed after a given motive or design.

Diagram Fig. 43 is the analysis of weave Fig 42.

Diagram Fig. 44 is thc analysis to weave Fig. 43 and diagram Fig. 46 the analysis to weave Fig. 45.

In every instance with reference to weaves Figs. 40, 42, 44 and 46, only the figure warp is shown, no notice of the binder warp being taken, since the latter works uniformly $\frac{1}{1}$ from



one or two harnesses as the case may be.

LESSON.

1.—Construct the plain, warp effect, rib weave, $\frac{1}{4}$ motive. Repeat 2 × 8.

2.—Construct the plain, filling effect, rib weave, $\frac{3}{3}$ motive. Repeat 6 × 2.

3.—Construct the following fancy warp effect, rib weaves:—

$\frac{1}{3}\,\frac{3}{1}$ motive. Repeats 2 × 8.
$\frac{1}{1}\,\frac{2}{4}$ motive. Repeats 2 × 11.
$\frac{3}{4}\,\frac{1}{4}$ motive. Repeats 2 × 12.

4.—Construct the following fancy filling effect, rib weaves:—

$\frac{1}{2}\,\frac{2}{1}$ motive. Repeats 6 × 2.
$\frac{3}{1}\,\frac{3}{3}$ motive. Repeats 10 × 2.
$\frac{4}{1}\,\frac{3}{2}$ motive. Repeats 10 × 2.

5.—Construct the following fancy basket weaves:—

$\frac{3}{1}\,\frac{1}{3}$ motive. Repeats 8 × 8.
$\frac{1}{2}\,\frac{4}{2}$ motive. Repeats 9 × 9.
$\frac{1}{3}\,\frac{2}{2}\,\frac{3}{1}$ motive. Repeats 12 × 12.

6.—Since fancy baskets are used to a great extent as motives in connection with figured fabrics executed on the harness loom (jacquard effects) like table covers, upholstery, shawls, etc., produce the following extreme examples of fancy baskets (for use for motives for such fabrics):

$\frac{1}{1}\,\frac{2}{3}\,\frac{4}{5}\,\frac{8}{8}\,\frac{4}{3}\,\frac{2}{1}$ motive. Repeat 39 × 39.
$\frac{1}{1}\,\frac{2}{2}\,\frac{3}{3}\,\frac{4}{4}\,\frac{5}{5}\,\frac{6}{6}\,\frac{7}{7}\,\frac{8}{8}$ motive. Repeat 72 × 72.

7.—Produce the following four figured rib weaves, according to their respective motives:—

$\frac{2}{3}\,\frac{3}{2}$ warp rib 10 × 10	$\frac{2}{3}\,\frac{3}{2}$ filling rib 10 × 10	$\frac{1}{2}\,\frac{3}{2}\,\frac{1}{1}$ warp rib 9 × 9	$\frac{1}{2}\,\frac{3}{2}\,\frac{1}{1}$ filling rib 9 × 9
$\frac{2}{3}\,\frac{3}{2}$ filling rib 10 × 10	$\frac{2}{3}\,\frac{3}{2}$ warp rib 10 × 10	$\frac{1}{2}\,\frac{3}{2}\,\frac{1}{1}$ filling rib 9 × 9	$\frac{1}{2}\,\frac{3}{2}\,\frac{1}{1}$ warp rib 9 × 9
Repeat 20 × 20		Repeat 18 × 18	

Motive.

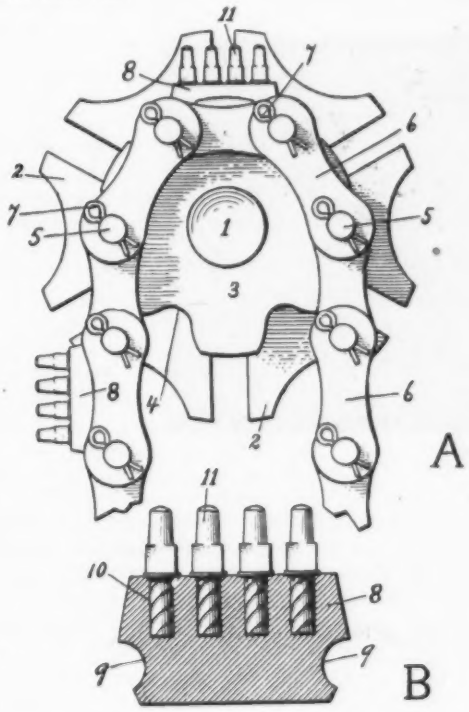
For every ⊠, paint 8 × 8 $\frac{2}{2}$ warp rib
" " □, " 8 × 8 $\frac{2}{2}$ filling rib
Repeat 32 × 32.

Motive.

For every ⊠, paint 8 × 8 $\frac{2}{2}$ warp rib
" " □, " 8 × 8 $\frac{2}{2}$ filling rib
Repeat 32 × 32.

A NOVEL CONNECTION FOR BARS IN THE PATTERN CHAIN FOR CROMPTON & KNOWLES DOBBIES.

The gist of the improvement consists in the method of securing the wooden bars as carrying the pegs of a dobby pattern chain to each other. The connection of the bars is somewhat similar to that employed on their ball and chain dobbies, the manner in which it is adapted to the wooden bars being best explained by referring to the accompanying illustrations, of which Fig. A is an end view of the pattern chain barrel as carrying the pattern chain, the bars of which are shown with the improved connection. Fig. B is a vertical section through a bar with pattern pegs (in side elevation) shown inserted into said bar.



In the figures, 1 indicates the pattern chain barrel or cylinder, which is loosely mounted on the shaft (not shown), and is rigidly connected to and rotated with the star wheel 2, said star wheel receiving its motion from a revolving pin (not shown).

The pattern chain barrel 1 has at each end a head, 3, having grooves or recesses, 4, to receive the ends of the iron rods, 5, of the pattern chain. Two of these rods, 5, are connected on either side of the chain by means of a metal link, 6, having a hole near each end, to receive the ends of the rods, 5, said link being kept in place by having split pins, 7, placed in holes placed near the ends in the rods, 5. Every pair of rods, 5, carries one of the wooden bars, 8, of the pattern chain, the shape of said bar being shown in its section in Fig. B. The length of the bars is a little less than the length of the iron rods, 5, and of a width a little greater than the distance between two of these iron bars, 5. On each side of the wooden bar 8, near its lower surface, is provided a concave recess or groove, 9, sufficiently large to readily receive the iron rod, 5, previously referred to. By means of the rods, 5, extending in the grooves 9, of the bars, 8, said bars are supported and maintained in position on the pattern chain. To prevent any endwise movement of the bar, 8, on the iron rods, 5, tubes are placed on the iron rods, 5, at each end, to extend between the ends of the bars, 8, and the metal links, 6. The wooden bars, 8, are provided with a series of holes, 10, to receive the pattern pegs, 11, which are made with a reduced shank to extend into the holes, 10, in the bars, 8, having an enlarged upper portion to engage the upper surface of the bars 8. The holes 10 in the wooden bars 8 extend about half way through the bar, which is a sufficient depth to receive and properly hold the reduced ends of the pegs 11. In assembling the parts of the chain, the bars 8 are connected with the iron rods 5 by removing a connecting link, 6, which connects two ends of the rods 5, from one side of the chain and inserting the wooden bars, 8, between a pair of iron rods, 5, by fitting the rods into the grooves, 9, prepared for them, and then replacing the metal link, 6, and the split pins, 7. The wooden bars, 8, may be provided with one or more series of holes (four being shown in the illustration) therein (according to scope of dobby) to receive the pattern pins 11.

Ribbon weaving has existed in St. Etienne, France, since the 11th century.

CORRESPONDENCE AND NOTES

Upon Textile Topics at Home and Abroad.

PINA DRESS GOODS.

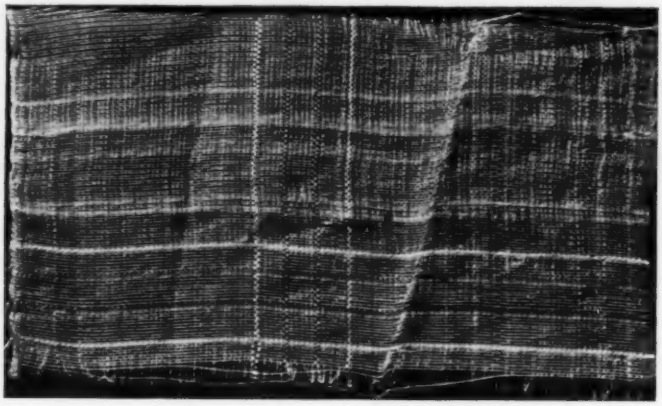
The pina cloth of the Philippines is mentioned by nearly every writer upon the manners and customs of the Filipinos. A German, Prof. Rinne of Hanover, visiting the archipelago right after the war with Spain and during the insurrection, thus describes the women and their mode of dress:

The Tagal girls are very pleasing, even to European eyes. They are not of pure Malay; Chinese, Japanese or Spanish blood often runs through their veins. Light, rosy complexions are not found under this tropical sun and, as at all times and in all places nothing is more desired than the unobtainable, so here nothing is more prized than a clear complexion. A Malay woman may, according to our ideas, be ever so ugly, yet if she has a fairly light complexion, she passes for a beauty. European etiquette is not the same as that observed in those tropical regions, and we should not be too quick to condemn the women of the Philippines. It is not considered out of place for young women to appear on the street with a dress cut as low as those worn at our balls.

Owing to the disturbed state of the country, the women keep their trinkets and finery concealed except on Sunday, when they go to church in black patent leather shoes, red stockings and clothes of the most dazzling colors, each carrying an European parasol. She wears the attractive national costume, a colored gown with a long narrow train, a black overskirt, a bright colored jacket and a lace collar around her neck, while her slender arms are seen through the transparent pina cloth.

Pina cloth is also worn by the men. The writer just quoted says:

In contrast with the variegated colors worn by the women is the white apparel of the Tagal man. Besides the white trousers, he wears a white shirt like that worn by the European, but instead of tucking its folds inside the trousers he lets it hang down straight like a coat. In place of this shirt he sometimes wears a particularly transparent garment made of pina cloth.



PINA CLOTH

The following account of the pineapple fibre is taken from that valuable work, "Useful Fibre Plants of the World," by Charles Richards Dodge:

Both the wild and cultivated pineapple yield fibres which, when spun, surpass in strength, fineness and lustre those obtained from flax; can be employed as a substitute for silk, and as a material for mixing with wool and cotton. It is useful for cordage, textile fabrics, sewing silk, laces, etc. In China the fabric is used for clothing. It is remark-

ably durable and unaffected by immersion in water, is white, soft, silky and long in staple. Government experiments in Florida in 1892 showed that some samples which had been cleaned without washing and twisted to the size of binding twine, showed a breaking strength of 150 pounds. A specimen of this fibre was subdivided to one ten-thousandth of an inch.

The culture of the pineapple in Florida for its fruit is a comparatively recent industry, the first plantings having been made on the Keys in 1866, though the first plantation of commercial importance was not established until fifteen years later, on the Indian River. The value of the fibre has long been known, however, and in 1891 the United States Department of Agriculture began a series of investigations into the practicability of utilizing the Florida leaves for fibre after the fruit had been gathered, as their utilization would give the United States a new industry. In the experiments of 1892 it was shown that the yield of fibre from freshly cut leaves ranges from 45 to 60 pounds per ton. An important point to be noted is that selected leaves do not give as high a yield of fibre as average leaves, the average leaves yielding at the rate of 57 1/2 pounds to the ton, while the selected leaves yielded less than 44 1/2 pounds of fibre to the ton. Another lot tested was from Fuzzard's plantation near the Perrine grant, and consisted of 1,000 pounds of leaves with the tips cut off. The leaves averaged 10 to the pound. Dry fibre from this 1,000 pounds weighed 18 pounds, 2 ounces, or a little more than 40 pounds to the ton of leaves. It should also be noted that there was an excessive waste of the fibre in the process of cleaning.

The practice has been to allow the leaves to decay under the plant and afford possible nourishment to the young suckers. The general opinion is in favor of cutting the leaves, but experiments covering several seasons will be necessary to decide this point. The plants are spaced about two feet apart, which obviates injury to the leaves by chafing, or by being crushed during the weeding and gathering processes.

In 1892 the average yield of good leaves from the Red Spanish variety in the extreme southern part of Florida, was about 10 to the average 25 of each plant, and the weight 1 pound, making the total for fruited plants, in round numbers, 958 tons. Adding the leaves to be secured after the close of the season and from abandoned fields, the quantity might be raised to 1,000 or 1,100 tons.

As to the value of the fibre, the London quotation for a lot of well cleaned from an Asiatic source was $150 per ton. There is no doubt if the fibre could be produced in quantity that manufacturers would soon find a use for it, and know what price they could afford to pay for it. The market price would then be fixed by the law of supply and demand. The machine question enters largely into the problem, however, and as the leaves are small a quantity would need to be fed to the machine at one cleaning to make it pay. Estimating 10 leaves to the pound, there would be over 22,000 leaves to the ton, which, as we have seen, would produce from 50 to 60 pounds of fibre.

The machine used in the Department experiments produced a fine product, but in too small a quantity to be employed commercially. There is no doubt that a modified automatic sisal hemp machine would do the work, though we understand a machine has recently been constructed for all small-leaved plants that may be adapted for extracting this fibre.

In China the fibre is extracted by hand. The first step is the removal of the fleshy sides of the leaf. A man sitting astride a narrow stool extends on it in front of him a single leaf, one end of which is held beneath him, and with a kind of two-handled bamboo plane removes the succulent matter. Another man takes the leaves as they are planed, and with his thumbnail loosens the fibres about the middle of the leaf, gathers them in his hand, and by one effort detaches them from the outer skin. The fibres are next steeped in water, washed, and laid out to dry and bleach on rude frames of split bamboo. The processes of steeping, washing and exposing to the sun are continued until the fibres are considered to be properly bleached.

The Chinese fibre is manufactured into a strong, coarse fabric resembling the coarser kinds of grass cloth. In Formosa its chief use is for the inner garments of the agricultural class. The fabric is called Huang-li-Pu.

The pineapple cloth of the Philippines is produced from the common pineapple also. The plant is wild and has leaves from 5 to 6 feet long, which appear to yield better fibre than the cultivated plants.

Pina is considered to be more delicate in texture than any other fibre known to the vegetable kingdom. It is woven from the untwisted fibres of the pineapple leaf after reducing them to extreme fineness and after the ends have been glued together to form a continuous thread. There is another delicate fabric, used for ladies' dresses, which is said to be made from pineapple fibre woven with silk, the latter forming lustrous stripes in soft colors or shades.

At our request a soldier now serving in the Philippines sent us samples of this pineapple or pina cloth, one of which is shown in the accompanying illustration. The threads in this

Even upon the same class of work, there are often conditions to cause a variation from the different looms, and while it may not be policy to set a limit for the weavers, it is certainly worth while, in striving to correct abuse, to keep a record of the result from each loom, in order to draw fair and intelligent conclusions regarding the work of the individual weaver; where it seems that the amount of waste is excessive, it will be best to watch the weaver's methods, to ascertain whether he is at fault, and if he is found to be so, it can best be remedied by correcting him at the loom, "in the act," rather than to criticise blindly the result of his week's work.

In the latter case he would certainly offer an excuse, while he could not dispute the evidence when presented before his eyes.

The average weaver is not reputed to be more conscientious than the common run of men in other vocations, and if his reputation is to be in any measure determined by the amount of waste found in his box at the end of the week, it might in some cases, result in some sort of "sleight-of-hand" to deceive the overseer, and possibly prove an injury to a more conscientious weaver on the same kind of work.

The overseer who knows from week to week the amount of waste made by the individual weaver, as well as the average, will be able to estimate very nearly what the result of honest endeavor should be, and also readily determine where to look for the abuses. When corrected right at the loom, there will be little chance to evade the responsibility, or to shoulder it on to a neighbor. When each weaver understands that the overseer is observant of his methods, as well as the weekly results, there will be a constant tendency to seek approval by honest rather than unfair methods. By a constant feeling that justice will be done, there will be a growing tendency toward better methods and desirable results.

In justice to the weaver, however, it may be said that ofttimes he is not wholly responsible for excessive waste. The condition of the yarn when it comes from the spinning room is often responsible for much of the waste that is made in the weave room.

Imperfect yarn, bad building of the bobbin and "soft bobbins" caused either by inferior stock, imperfect mixture or neglect in the carding or spinning room often lead to the accumulation of weave room waste, despite the best efforts of the weavers, and all these matters should be taken into account, and corrected at the right place.

In this connection it may be said that the weavers should be taught to lay aside such bobbins as are likely to cause trouble, not only that the overseer may know the true condition of the work, but that they may be rewound if expedient, and thus avoid the necessity of consigning them to the waste.

When the help are taught the true importance of this question, and feel they are individually under the watchfulness of the overseer, and that care in the matter is as important as production, it will be easy to continue the discipline.

Of course the overseer cannot watch all the help at once, but an occasional correction at the right time, will give the weaver the impression that the overseer is not a "wall-flower" and that he will be judged by his efforts to give the mill the best results of his efforts.

Another feature of this waste question covering its proper and profitable care and use is worth attention, and may be considered later.

HOW TO SET AND RUN A RAG PICKER.

BY SAM DRIVER.

1. The rag picker should be set level on a solid foundation. The cylinder should run from eight to eleven hundred turns per minute according to the stock; ten hundred is, perhaps, the best speed for all kinds of stock.

2. The cylinder should be turned at least twice a week; oftener is better. I know where they turn them every week.

3. For hard twisted cloths, felts and yarns, the feed roll should be set close to the cylinder, say 1/8 inch from striking, and should be wound even with wet cloth until it strikes the cylinder.

4. For soft woolens, set the feed roll farther off the cylinder, say 3/8 inch, and wind with wet cloth until it strikes the cylin-

der. Never let the picker feed apron run without any stock; it knocks feed belt off. It spoils the winding already on feed roll, which is very important in making good shoddy.

5. Rags should be fed on lengthwise and not too heavy. The lumping fan and plate above feed roll should be set 1/8 inch from the cylinder. Set the lumper plate on back of picker, so that it will touch the cylinder, then raise both sides alike off the cylinder enough so they will not strike the cylinder. By setting this way you can get both sides alike. If too much stock flies out, the picker is being fed too heavy.

6. After the picker has run a day, the stock winds on the end of the feed roll. This should be taken off every night; never leave nights without seeing that the feed roll is not too hot. If too hot, wet down with cold water before leaving.

7. Always have a pail or barrel of water handy to get at in case of fire. Keep the inside and outlets free from gum. A direct steam pipe should run into the gauze room, which should be fireproof. Never have much stock in the gauze room at one time. It should be cleaned out every night before leaving. There may be fire in the middle or underneath the stock and you may not know it

8. Lay down batches twelve hours before being picked, and lay down in these layers 3 quarts of clear oil for 100 lbs. for rags, and 2 quarts for yarn, waste or hard ends. Never use water or emulsions. These cause the fine particles of flocks to form a paste, which is afterwards seen in the card rooms. Water is not put on to help pick the stock better, but is put for another purpose, which I will leave you to guess.

9. In opening bags or bales, look out for strings, bobbins, cotton rags, noils, small pieces of belt, lace, leather, matches, large knots, broom straws and most everything else but dollar bills and silver.

10. Every time the cover is taken off, examine the lags to see they are not loose, straighten crooked teeth. With a good faithful, careful man who will keep stock on the feed apron and belts on tight pulleys, a large amount of stock can be run through in ten hours.

FINISHING WOOL AND MIXED FABRICS.

XXVII.

BY N. REISER.

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DECATIZING.

The word decatizing is derived from the French word decatir, meaning to remove lustre; at present, however, the term is used to describe the process for increasing or fixing the press lustre on woolen goods. If all the lustre created by pressing is left on the cloth, the surface will be spotted by every drop of water that may fall upon it. In early times, before the decatizing process of the present was known, the cloth, after having been sprinkled, was laid in regular folds. Boards were then laid across the pile and heavy weights placed on top. The next development of the process consisted in winding the cloth on rollers instead of laying it in folds. At the end of the eighteenth century the first experiment in decatizing with steam was made. It consisted in placing the roll of cloth in a cylindrical vessel, which was in turn placed over a tub filled with boiling water. The steam rising from the water into the cloth holder worked its way through the goods. This process removed the press lustre, which could not be restored by the subsequent unfolding and cooling while damp. Still later it was learned that press lustre could be fixed by steam if the cloth was tightly wound on the roll.

The objects of decatizing are, first, to increase and fix the press lustre, the last being accomplished especially by so-called plate decatizing; second, to solidify the fabric and prevent shrinkage during the subsequent process of dyeing; and third, to make the cloth smoother and give it that peculiar handle called the "clothy feel," and make it drape well when made into a garment.

To determine whether the lustre has been obtained by decatizing or pressing, the cloth is exposed to steam. The lustre obtained by decatizing is not removed by this treatment, while that produced by pressing disappears entirely. Goods are sometimes decatized to

increase or maintain the width, and to equalize the width of cockly pieces.

The wool fibre, when subjected to moisture at a high temperature, becomes soft and swells up. If a section of a piece of face goods is examined, it will be found that the fibres do not form a flat surface, but where they project from the fabric are more or less curved. This is the case with all kinds of wool, especially coarse qualities. If the cloth is pressed warm the fibres are softened and forced down by the pressure. The wool fibres offer a resistance to this pressure which is especially noticeable when pressing with a plate press. The press can not be screwed as far before the press is thoroughly heated as afterward. If the workman forces the press as far as he can and then waits half an hour or more for the cloth to become heated he will find that the press can be screwed up still further. Assuming that the nap is long and well laid by the gig and brush, the fibres will lie more or less parallel during the pressing and consequently a smooth surface will be obtained. The fibres come in contact with the hard surface of the pressing plate and are bent at the point where they project from the fabric. Goods to be pressed should not be too dry, otherwise the fibres cannot be brought by heat and pressure to the necessary condition and the desired lustre cannot be obtained. A moisture of eighteen per cent. is sufficient. If the cloth is too dry it is well either to hang it for a time or fold it back and forth in a damp place, or moisten it on a dampening machine.

If cloth is pressed and finished with decatizing the loose fibres gradually will rise from the surface of the cloth which thus assumes a fuzzy appearance, and every drop of water falling on it makes a spot. The cloth should not be subjected to moisture and heat for too long a time as otherwise the fibres are apt to be softened and the fabric made tender. Fast colors are made brighter by decatizing owing to the increased lustre of the goods. White and light colors are made yellow by a high temperature.

Care should be taken that there is no dirt, alkali or other chemicals in the steam, as is often the case when the water is impure or compounds are used for cleaning the boiler. Alkali is very injurious, especially to light colors.

Many finishers claim that woolen cloth is shrunk by decatizing; this is only the case when the goods are wound loosely on the roll, when the cloth had been previously stretched too much on the tenter bars, or when the fabric is naturally slazy. If the pieces are wound very tight on the roll, shrinking is out of the question, because the fibre is in reality stretched instead of shrunk.

There are two kinds of decatizing, dry and wet. With the former only dry steam is used, while with the latter wet steam and hot

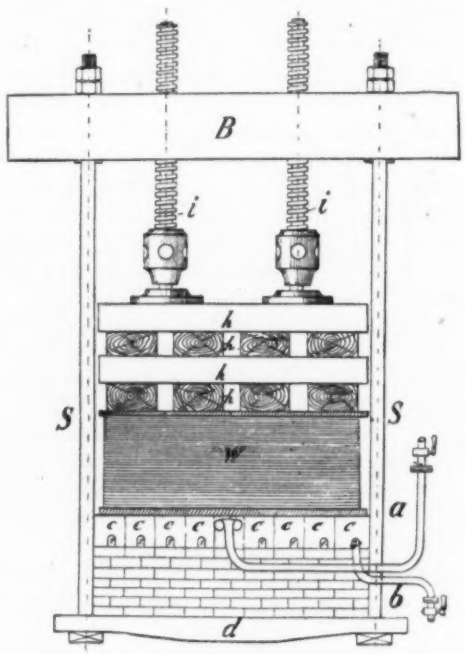


FIG. 100.

water are employed. Goods are decatized by the dry method with either plates, rolls or boxes.

THE PLATE PROCESS.

Fig. 100 shows an apparatus for decatizing with plates. It rests upon a foundation above which is a square steam chest. At the end of this chest a small steam pipe enters, a, from which four branch pipes run to the four corners of the box so that the steam is uniformly distributed. The drip pipe, b, car-

ries the condensed water away. Directly over the chest is a strong, perforated wooden cover. On this are laid a number of thicknesses of jute and over this five or six thicknesses of cotton cloth. The cloth to be decatized, w, is laid in open width in about eighteen inch folds, several pieces being placed on each other. From four to six pieces of cotton cloth are placed above the pieces, then some thicknesses of jute, above which is the solid plate; above this again are placed pieces of heavy plank, h, in the form shown in the illustration. The pressure is applied to the cloth by screws, i, i. This method is likely to result in imperfect work, as any irregularity in the folds will cause a difference in the decatizing process. After the pieces have been steamed they are taken out, refolded to bring the pieces in the centre of the plate, and again decatized.

This method is but little employed at the present time. It, however, gives a very high lustre as greater pressure can be obtained than by other methods.

THE DRY PROCESS.

The goods are wound on the roll which has been previously covered with several thicknesses of cotton cloth. Steam is then introduced into the cylinder and passing through the perforations, works its way into the goods. The duration of the process depends upon the particular finish desired and the pressure of the steam. This is erroneously called the dry process; in reality more or less moisture is carried into the goods by the steam. The term arose in order to distinguish it from the wet process to be described. To obtain good results the pieces must be smoothly wound on the perforated copper cylinder. The perforations should not extend to the selvage, as otherwise the steam will force its way through the holes outside of the roll instead of through the cloth. The cylinder should be bored so that the narrowest pieces will extend about four inches beyond the perforations on each side. The cylinder, when upright, is closed at the top. When placed in a horizontal direction the steam is sometimes introduced from each end.

WINDING THE PIECES FOR DRY DECATIZING.

Figs. 101 and 102 show machines for winding pieces that are to be decatized. The first, built in Verviers, Belgium, has one winding-off roll; the second, built in Berlin, has two of these rolls. The pieces are first wound either single or double, according to the capacity of the machine, and are carried from

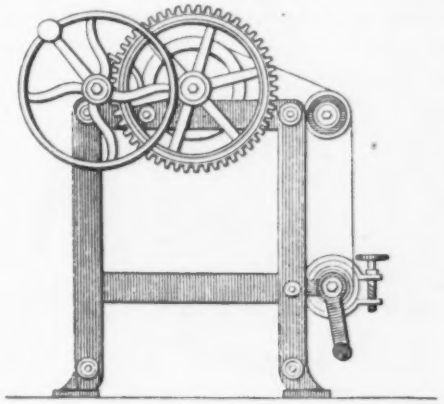


FIG. 101.

the lower roll to the steaming cylinder above. The lower roll is provided with a friction device to wind the goods on the upper roll as firmly as may be desired. Care should be taken to have the pieces free from wrinkles and folds and the selvages wound evenly. This is especially necessary when the goods are made with plaids or pronounced stripe effects.

Several yards of coarse linen or jute cloth is first wound on the steaming cylinder, above this another length of well gigged cotton cloth. This jute and cotton cloth must be wound very evenly in order to avoid bunches on the cylinder which are sure to cause marks on the cloth that are very difficult to remove. Under no circumstances should the cloth come in contact with the bare cylinder, otherwise water marks will be caused. These marks are also made by using wet steam, which especially at the beginning of the steaming process carries more or less of condensed water into the pieces. The jute and cotton cloth should not be so thick on the roll as to prevent the steam passing readily through them into the goods.

If the cloth to be treated is of a dark color,

the rolls should be wound with a dark colored cotton so as to prevent light fibres from getting on the face of the fabric. The cotton cloth should also be of a rather fine texture as coarse goods will leave an imprint on the ends of the pieces. Wide pieces are sometimes folded lengthways with the face in, and wound in this form on the short roll. This method can be used only with smooth face goods; if there are raised places in the pattern they will cause an indefinable moire effect. Goods made with raised patterns, such

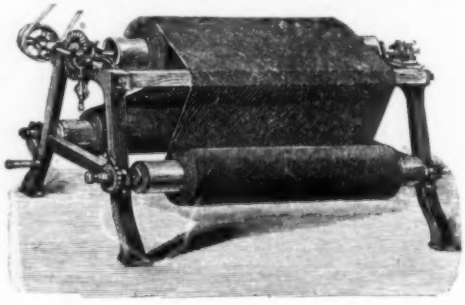


FIG. 102.

as diagonals, must be wound with an extra piece of cotton cloth so as to separate the folds of the goods. If two folded pieces are treated on the same roll, the selvage of one should be wound at the right, and the other at the left, otherwise one end of the roll will be too high. The two pieces wound together must also be of exactly the same width.

The winding of cloth in the open width is somewhat easier, but if the back of the fabric is made with coarse yarn it is advisable to either to wind two pieces at one time face to face, so the back will not come against the face, or to wind an extra piece with the one to be steamed in order to keep the folds of cloth separate. Where the extra piece is used the machine shown at Fig. 102 is very convenient, as it has two rolls, one for the regular goods and another for the extra cotton piece.

When treating two pieces, winding one after another on the roll, it is advisable to sew the ends together very carefully to avoid marks in the centre of the roll. After the goods have been wound, from six to eight yards of napped cotton cloth is first wound wrapped around the roll and on top of this is wound a piece of sail cloth. This prevents the cloth on the outside of the roll from cooling too quickly and keeps the temperature more uniform throughout the piece. No matter how the goods are wound, that part next the roll acquires more lustre than the rest of the piece.

Light colored goods are decatized very lightly and an extra quantity of cotton and jute cloth is wound on the cylinder.

(To be continued.)

A REEDING MACHINE AND LENO SELVAGE MOTION.

The accompanying illustrations show a reeding machine built by Henry Baer & Co., Zurich, Switzerland. Fig. 1 is a view of the entire apparatus mounted in an iron frame; Fig. 2, the working parts of the machine, in-

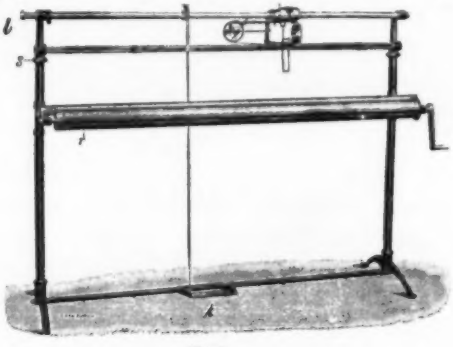


Fig. 1

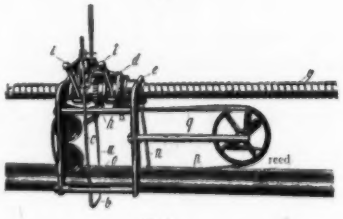


Fig. 2.

cluding a portion of the reed through which the threads are drawn. (a) is the upper drawing-in hook, (b) the needle opposite it. The point of the latter is flexible and rests against (a). Both needles swing on an axis and form with the arms (c) a solid structure part of the time. The arms (c) are extended and supported by the casting (d) which in turn is joined to the carrier (e); this carrier is threaded to fit the screw (g). Between (c)

and (d) are the levers (ii); the motion of these arms is in the form of a parallelogram.

They first carry the needles (ab) straight downwards, then sidewise, and finally under the influence of a spiral spring the needle (a) is gently pressed sidewise against the next wire of the reed. If the operator press the foot of the treadle shown at Fig. 1, the screw (g) is

Fig. 3.

turned about 60 degrees. The support (d) raises both needles (ab) through the reed. After the points of both needles, which are suitably formed or bent, are separated about the distance of one wire or dent in the reed, the pressure of the foot on the treadle is relieved, and the needle passes (a) into the adjoining dent. At the next rise, in consequence of this pointed form, the needle (b) presses against (a) and both enter the same dent. The threads are supplied to the hooks by the hand of the operator during the downward motion of the needles. The operator lays one, two or three threads in the eye of the hook, presses the treadle down and then draws the threads through the reed. At the same time by means of a nose on the support (d), the lever (n) is brought into action, carries the threads sideways and lays them between the links of the chain (p). By means of the lever (q) the chain (p) is moved back, carrying the threads with it. The device is carried sideways by the ratchet wheel (h) which is operated by a catch on the lever (i).

When one warp has been reeded the device is disconnected, slid back to the point of beginning and then connected for reeding another warp. It is said that several of these machines are now in use on the Continent and give good satisfaction.

LENO SELVAGE MOTION.

The same firm have also built a leno selvage motion for weaving the inner selvages where two or more widths of goods are woven at one time. This device is shown at Fig. 3.

There are many devices calculated to fasten the threads of the inner selvage, but those working upon the leno principle are the best and the machine shown at Fig. 3 is of this character. As shown in the illustration, it is supported on a stand which is screwed to the floor and comes between the reed and the harness. It is driven by a chain from the sprocket wheel of the loom shaft. This attachment costs $5 at Zurich, and it is said produces a solid and perfect selvage of very attractive appearance.—Oest. Wollen und Leinen Industrie.

Automatic Tentering Machine. C. H. Weisbach, Chemnitz, Germany, has brought out a cloth tentering machine with automatic feed, which. is said to be giving excellent results in many Continental mills. Only one attendant is required, the cloth being automatically hooked on the pins. One Baden manufacturer states with the hand fed machine the production was not over 38 yards per minute, and that with the Weisbach tenter he could get 60 yards per minute, the work being perfect.

MEMOIRS OF A VETERAN MASTER MECHANIC.

BY EBEN GOULD.

(Continued from September.)

When I was in Hyde Park the Merchants' Woolen Co. bought six self operating jack heads built in Worcester. They had one set up and running but it did not go to suit. It did not wind the yarn tight and made lots of waste by the yarn slipping from the bobbins while weaving. The boss spinner, the machinist and the super. all said it could not be made to run right and of course the owners and the agent did not want the other five heads put on unless they could be made to do better work.

They sent for me to see if I could make them work. I looked at the heads and at the one that was running and saw at once where the trouble was and told them I would put on another set of bobbins that would go all right. During this time it had been dinged into my ears by the boss spinner and the machinist and the rest that the speed of the gears was not calculated right and the draft of yarn could not be made to run the right speed. I told them this set would run O. K. when it was ready to start, the draft of the jack carriage would be all right and it would wind a good hard bobbin of filling.

In a few days the machine was all ready to start, Mr. Grinderfine, the owner, was there and when the jack got to work he says: "Now Mr. Gould, you can see the trouble with these operators. Look at the yarn when the carriage runs in; it sags down so as to wind a soft bobbin." He stooped down so as to see the sag better, but there was no sag to see. Then he asked me if the other operator could be made to run like this one. I told him it could as they were both alike, so he told me to go over into the other room and fix it and he would be there in a few minutes.

Just as I went into the room the spinner had stopped to doff his set of full bobbins and put on empty ones and while he was doing that I changed the draft of the jack carriage and changed the builder to a slower motion. When the bobbins were ready we started up and had just got the bottom formed on the bobbin when Mr. Grinderfine and agent Strong came in. He began to look for the slack but there wasn't any slack to see, the yarn was tight and winding a good, hard bobbin. He says, "Has this been fixed like the one you set up?"

I said, "Yes."

"When was it done?"

"While the spinner was doffiing his set."

"Is that all the time it takes to make such a change in the winding of the yarn?"

"Yes."

"Well," he says, "we must have a smart set of machinists and spinners here not to have had this work right; it didn't take ten minutes to make the change."

The quantity of yarn on the bobbin was more than double and a weaver could weave over eight yards a day more than with the soft bobbins and with less than a quarter the waste of yarn.

I never heard anything about the speed of the draft and gears being calculated wrong after that. The operators were all right but the heads of the ones that set up that first machine must have been a little out of gear.

At that time John Sundenbach was acting super. and he came into the room several times and talked with me about the bother they had with the other operator. Among other things he said that when it first started the carriage run off the track and one end swung round under the roller beam and broke things up pretty bad. I told him he wouldn't see this carriage off the track and on the floor. I stayed at the mills until all six of the operators were running nicely; not a carriage had jumped the track nor a soft bobbin been wound.

From these mills I went to J. F. Paul's new shop on Albany Street, Boston, to set up his boilers and engine, put up the shafting and attend to the steam piping for the drying rooms. The first job was to put the boilers in place and connect the different pipes for heating the mill and drying rooms as well as the main pipe to the engine. The boilers were called the Acme and were the poorest things I ever saw, unworthy the name of steam boilers. Each boiler was rated at 60 horse power but they were unable to make half that amount of steam. If they had been

run to 25 horse power they might have lasted six or eight months, but to drive them up to 60 they would not have lasted a week without breaking down. For a while after the works were started men would come from Pascoag, where the boilers were made, to repair them. Every week since they were started some of the tubes had blown out. One day when the boiler makers were there Mr. Paul came in and asked them what was the cause of the breaking down of the boilers. One of the men said:

"When they break they can't do any other damage."

"No," Mr. Paul says, "they break so darned easy they can't."

Very soon after that it became apparent to Mr. Paul that the Acme boiler was a failure and they were replaced by the regular cylinder boilers. After they were in place my next job was to put up the main shafting. I first drew a line the length of the mill and put up targets so as to get the hangers in proper shape. One day some one went into the mill during my absence, moved the targets and changed some of the line marks so as to make me set the hangers out of line and cause the shafting to run badly. I discovered the trick that some one had intended to play on me and concluded to keep it entirely to myself and go on as if nothing had happened.

In time the hangers and shafting was all up, and then a line was drawn at right angles to the main shaft through the side of the mill and the engine room. This line was to be used in setting the engine square with the shafting in the mill.

I had nothing in the engine room on which to fasten my line so I took a piece of board and nailed it to the wall and fastened the line to that. I made a centre mark and worked the measurements over and I found the marks were all right. I then took down the line to wait the coming of the engine. I felt that if any one was disposed to come in of a Sunday and do some more funny work, that line for the engine would be just the place where they would do their mischief, as nothing would work worse than to have an engine set out of line with the shafting. I meant to make a sure thing of my trap, so I cut a measure from a certain spot in the side wall of the engine room to my line mark on the board which I had nailed to the wall and kept it hid till I wanted to reset the line after the engine came.

I was not surprised to find a few days later that the board had been taken from the wall and moved several inches, enough to ruin all my work. I kept quiet and said not a word to anyone. I drew the lines for the foundation stones on which the engine was to stand. When the engine came the builder asked me to give him the line by which the machine was to stand. I drew the lines and fastened them, using the measure I had made from the side wall of the engine room, then told him to go by that line and he would be all right. I worked with the builder and his men getting the parts into place and several times he spoke to me about the importance of having the line correct. At last I asked him if he could set his machine by that line. He said he could, and I told him to go ahead and do it for I shouldn't touch that line until I took it down for I knew it was right.

Then I knew that some one had told Mr. Paul that the shafting was out of square with the engine line, but I kept shady and had a private mark for every bearing in the mill as well as for the engine and felt sure I had the lines all perfect. We went to work, got the machine in place and the steam pipes all connected, the belt on from the main shaft to the engine and the steam up all ready to start. Mr. Paul and many others were there and no doubt some of them were expecting to see the main belt run off the side of the pulley and balance wheel.

Before starting that day I had carefully looked over all the bearings of the main shaft and found those near the main pulley had been set to one side but not enough to prevent their being easily adjusted and before starting I was sure everything was all right.

When the steam was up and everyone was looking anxiously to see the start of what was at that time the largest steam engine in Boston, Mr. Paul looked at the valve motion for a minute and then at the balance wheel. The belt was exactly in the centre. Then he ran to the mill where the belt went on to the main pulley and I after him. When I got there he said:

"Look at the belt, right on the centre of the pulley. Why, when we first started the mill up at Tremont St. the belt run off the pulley and against a post and like to have set the mill on fire."

He seemed quite pleased and went the length of the mill and found everything running easy and free.

I never knew who did the funny business but presume that he was there to see the works start and I hope he enjoyed the sight as much as I did.

At that time Mr. Paul made a practice of giving the overseers and others of his help that had families a turkey the night before Thanksgiving Day. He would clear out one of the rooms in the mill, erect long board tables on which the turkeys were spread, each having a card attached bearing the name of the party for whom it was intended. At one of these times there was a small boy at work in the mill and he was called to help place the turkeys on the table as they were tagged. A very small turkey was tagged for the boy and next it was a very large one tagged for one of the overseers. After they were all placed, the boy unknown to anyone slipped into the room and changed the tag from his little bird to the large one. When the help were all assembled, a man would read the name on the tag and whoever he called out would come forward and take his turkey. What a surprised look came over Mr. Paul when his overseer was called, to see him handed the smallest turkey of the lot and every one laughed thinking it some joke on the overseer. Soon after the boy's name was called, and when he went up to the table, and the biggest turkey of the lot was handed to him, every one roared. Mr. Paul was as much amused as any one and would not have the turkey changed, but sent to the market for a larger one for the overseer.

When the works were fully started Mr. Acme used to bring people there to see how well his boilers worked, and he would tell some great stories as to what these boilers could be made to do. One day I asked him what he told such whopping big stories for and he said that was not lying; that was business. He and his selling agent both wanted me to help sell their boilers by speaking well of them to any parties they might send there to see them. One day a stranger came and wanted to see what the Acme boilers were doing. I showed him about, but I could not say anything I thought would induce him to buy them. He went back to Acme's agent and told him I talked so unfavorably about them that he had concluded not to take them. Acme came to me vexed enough about it. I certainly think he should have been able to decide for himself without bringing me into it at all. I told Acme that I guessed the man didn't rightly understand me and he had better have him come again to the mill and I would show him what the Acme boilers could do.

A few days later I got word that the man would be at the mill the next day. I went around to the different overseers and told them I was going to show what the boilers could do and the next day I had all the machinery possible at work and the fires in the best possible condition. The man came and I told him I would like to show him all the boilers were doing then, so I took him into all the rooms and let him see for himself what a load the engine was driving; then I showed him all the drying rooms that were being heated by the steam from those boilers. I saw he seemed quite pleased and in favor of the boilers and I hated to see him go away with such a good impression for, to tell the truth, I had been expecting every minute that some of the tubes would blow out with the steam up to where it was kept to drive the load that was on at that time, so I said:

"I have showed you what the boilers are doing today and what they are recommended to do, but they are a new kind of boiler to me and I don't know whether they will last five minutes or five years."

"Oh," he said, "I have no fear of their durability, I am satisfied that they will last as long as any boiler."

"Well'" I replied, "you can do as you please; you have seen what they are doing and you know how long they will last; I can make them do their work and you can make them last."

He went away then and I reduced the speed as soon as possible. He bought the

Acme boilers and in a very little time had to replace them with those of other make. Afterward the man was talking with a friend of mine and he said I was a good mechanic and a good engineer, but he wouldn't take my recommend for anything because it was my showing up of the Acme boilers that induced him to take them and they were not worth anything. My friend said he didn't think I ever recommended the boilers and that when I told him I didn't know whether they would last five minutes or five years he ought to have known I had some doubts about them. After that I was careful not to say anything in regard to the boilers for I knew they would soon be out of the mill altogether.

Once after that I had a chance to say a word about the Acme boilers. A man from Georgia came to the engine room, and wanted to look over the boilers and get my opinion of them. I told him the Acme boiler was a new thing and if he got them down in Georgia and they gave out no one there would know how to fix them, and he couldn't get any one from here to go down every week to make repairs. I told him the common tubular boilers were all right for twenty-five or thirty years but if he got the Acme boilers and tried to make them do the work they were recommended to do they would not last a month. I did not see him again for a year when he came into the engine room again and said he had come to thank me for my advice in regard to the boilers, for he had bought the kind I had recommended and everything in his mill was running nicely.

(To be continued)

Braiding and Plaiting Machine. Thomas Larmuth & Co., Salford, England, are placing ing on the market an improved braiding machine which has been designed to meet the increasing demand for covering electric and telephone wires. The crossing motions work under and over each other from the outside of the machine. It is claimed that the production of this machine is very large and that the speed is limited only by the rate at which the yarn can be unwound from the bobbin.

ENGLISH NOTES.

(From our Special Correspondent.)

The stripe in really high class men's wear is on its last legs. The newest stripes are so faint and so interspotted that the character of a stripe is merged in an unobtrusive mixture. The mixture itself trenches on the plain and thither men's fashions are gliding. The plain blue serge is soon to become as recherche as

any worsted upon the market, if the prophets are not false. Fig. 1 shows a pattern produced by the leading Huddersfield mill.

The back is shown at Fig. 2. Short lengths of the cloth have been woven for vestings, showing parti-colored silk spots at wide intervals. The silk, of which two ends are used as one, is an extra warp, bound to the back by a satin weave and brought to the face as required. The effect is neater and the spot is firmer than any tambouring could be and the cost is not disproportionate to the advantage. Trade and public have taken warmly to the innovation. It has proved a decided catch.

Another suggestion for those in search of a worsted novelty is thrown out for what it may be worth. In a six and six check plain filling might be used for the trousering. The coat and waistcoat would thus be a neat

check and the trousers of a thoroughly harmonious stripe. Such an idea has been tried, but so long ago that it would be hailed as new today. It has the merit of simplicity and if it took at all would be likely to take well.

Referring to a recent note in these columns on the subject of the silk cartridge bags imported from Germany to America, I am moved to direct attention to their use when worn out. In Manchester they are bought by the ton, and when pulled and garnetted are used again as noils. Their color is defective, their staple is short, and they are liable to preserve the twist and unopened swatches of woven rag, which are far from beneficial to any card wires they may subsequently meet; but at a low price they have their uses. For making yarns for silk cleaning cloths, for mixing with woolen, or even for making cartridge bags again, they have their field of employment. Where possible, both English and Continental carders prefer the original noil. The fabric should be tested for cotton and the presence of oil or soap should be noticed.

Artificial horsehair is one of the newest developments of manufacturing enterprise, the invention of a London chemist who is curiously reluctant to bring his novelty before American eyes. A yarn equal to horsehair in lustre and durability, and capable of production in great lengths, would no doubt find a welcome. By association of ideas I am reminded of a fruitless attempt to make an all-cotton "alpaca"; the warp of plain and the weft of polished cotton, somewhat similar to the well known sleeve linings of overcoats.

An alarming example of how not to dye reaches me through a friend. An English dyer was unable to obtain the correct, rather brown-yellow shade on a parcel of cheap blankets. After many attempts he was at last inspired to give the articles a bath in a solution of bichromate of potassium. As far as color goes the experiment was perfectly successful, though if the opinion of the ultimate wearers could be taken it would doubtless have sounded discouraging. The blanket touching upon an open sore or wrapped around a perspiring body would almost infallibly lead to blood poisoning, accompanied by excruciating pain.

METHODS OF TESTING YARN FROM CLOTH.

FROM NOTES ON SAMPLING AND TESTING BY J. H. LESTER, M. SC., F. I. C.

Two methods of testing were in regular use prior to the establishment of testing houses. Probably the older is that of "unweaving" the weft on to a small bobbin, then measuring off 120 yds. on a wrap reel, weighing, and ascertaining the count from tables. The chief disadvantages of this method are. (1) That a single continuous lea of yarn gives a very poor average owing to the common irregularity of yarn, particularly weft; and (2) that very considerable discrepancies result from reeling with too much or too little tension in reeling—on the one hand taking out all the curl or wave from the yarn, giving a finer result than is just or proper; and, on the other hand, giving too coarse a result when the curl is not taken out. That the method could be improved by ascertaining the maximum and minimum possible count from the same lea is not denied, but at the best the method is clumsy and tedious. No satisfactory application of the method can be made to warp yarns.

A method of more recent origin involves the use of a template, under which the cloth is cut to definite dimensions. A given number of threads are counted out on to a quadrant balance, and the result is read off on the scale. A variation of the method consists in adding enough threads to one side of a balance to equal the counterpoise on the other side, the number of such threads indicating the count. A spring balance, made from a delicate glass spiral, is sometimes used for the weighing.

The disadvantages of these two methods are:—(1.) That measurement under a template involves no sort of uniformity of tension. The tension is only the same when the cloths are very nearly of the same class and in the same condition of manufacture, so that the results are but approximate. (2.) That the scales are usually much too closely engraved, only accurate to perhaps one count on 40's. This is all that can be expected of the quadrant type of balance, and for accu-

rate results there is nothing better than an assay, or analytical balance, where the edges and planes are of agate. It is worthy of note that the quadrant balance may be replaced at scarcely greater cost by a sufficiently-accurate analytical balance.

When determining the count of yarn, we have merely to make determinations of weight and length, the rest being a simple calculation. Having found what is the best means of weighing, we must discuss the means and manner of measuring. The usual wrap reel is but a poor instrument for the purpose, because it gives us no proper means of regulating tension; and since, in case of warps at any rate, we have to deal with several threads of short length, we shall find that an ordinary inch measure of, say, 48 in. length, will be a convenient and sufficiently satisfactory instrument.

As a general method (there are exceptions to consider later), the yarn may be measured before dissection of warp from weft, but the conditions of tension must be carefully considered. We maintain, and substantial evidence supports this view, that if we can stretch the weft to the length it occupied when laid in its shed between the warps in weaving, our result will be substantially accurate. In other words, we should stretch the cloth by its selvages until the width is equal to the measurements across the warps where they enter the reed in weaving. In practice, this means that the cloth must be given a tight pull—more than is necessary merely to flatten the cloth, but much below the breaking strain of the cloth. The tension required will differ according to the character of the cloth, and really accurate results will depend upon experience obtained in the weaving shed. As a rule, the probable error from this cause is far less than the error due to uneven yarn.

In some cases, notably in sateens, if the loom measurement cannot be ascertained, it is advisable to accept the mean of the measurement just described, and the measurement of the yarn after removal from the cloth, in the latter case giving such tension as will just remove the wave. If there still remains any doubt as to the accuracy of the result, the possible error should be stated. These possible errors are usually very small; thus a weft yarn returned at 32's would seldom have a possible error of more than x 0.3; it might be 31.7's or 32.3's. It could not be finer or coarser than the extremes determined.

In testing weft it is the practice of the Testing House to measure and cut, say, 30 in., taking out several lots of from 10 to 30 consecutive threads, each lot being taken as far away from the next as the size of the sample will permit. By this means the analyst seldom confines himself to the yarn taken from a single weft cop, but obtains the best possible average. Under such conditions it would be fair to assert that 50 yds. would give a better figure than 120 yds. taken consecutively. It has been conclusively proved that ordinary lea tests vary considerably from different cops in the same lot, and that the same cop shows great variation in the different parts. Even 120 yds. taken consecutively from cloth made from the tested cops would give results from 32's to 35 1-2's. It is evident that samples can only give a result representing the whole piece when taken from a relatively large number of places or weft cops.

All cloths, even if weft only is required, are scoured to remove size, etc. This is obviously necessary in case of goods sized in the piece, but it is not so clear for nominally pure cloths; the reason is, that only by analysis can it be ascertained whether the cloth contains anything that artificially adds weight to the yarn. For instance, chloride of magnesium may have been used in sizing the warps even without the knowledge of the sizer, who unwittingly buys it disguised in a size composition. If this be so, a fair proportion must of necessity spread to the weft by absorption, carrying with it or taking from the air enough moisture to destroy the accuracy of the test. Analysis is, of course, out of the question, and the only safe course remains in scouring all cloths.

The scouring process has one most important feature to be reckoned with, and we believe that the Manchester Testing House was the first to consider or take any practical notice of the fact that even pure yarn does lose weight when washed, entirely apart from the minute quantity of fibre mechanically re-

moved. A preliminary investigation has been made, and the following figures give, with fair accuracy, the amounts of substance dissolved out of pure cotton by repeated boiling with distilled water alone. The extract was weighed in the absolutely dry state:—

Sea Island weft	1.58 %
American weft	2.15 %
American twist	1.99 %
Egyptian twist	2.03 %

The conditions of repeated boiling do not occur in the scouring for testing purposes, nor can such scouring alone remove as much as 2 per cent. unless strongly alkaline solutions are used. To be on the right side, however, and to have a useful round figure to work to, the full 2 per cent. has been adopted as a figure to be added to the weight of all scoured grey cloths.

A NEW CLASS OF YARN.

A somewhat peculiar, and rather wasteful, method of preparing yarn has been patented by a German cotton spinner, the aim being to obtain a union thread which is a good imitation of all wools. The principal feature of the new process is, that the long fibres of vegetable origin are reduced to the length of the short fibres of an inferior raw textile material of another kind, a part of these shortened fibres of better quality being then mixed with a greater quantity of the inferior kind and spun on the spinning frame. In this manner a yarn is obtained which, it is stated, can only be distinguished from one of superior quality with extreme difficulty. This is particularly the case when variously-colored fibres or hairs are united to make mixed yarns.

In order, for example, to manufacture from cotton fibre a yarn very closely resembling worsted, the wool (the single hairs of which, as is well known, are from three to five times as long as cotton fibres in a stretched condition), after being drawn, and therefore in the form of sliver, are cut to the same length as the cotton fibres in separate pieces, and then a small percentage of the cut woolen fibres mixed with a large percentage of cotton. If, then, this mixture is spun on a spinning frame having three pairs of carrier rollers, a product is obtained which it is said that even an expert can only distinguish from genuine worsted on very close examination, or by the aid of special means. The resemblance to worsted is all the more striking when the cotton fibres employed are dyed one color (e.g., black), whilst the wool is of another color (e. g., grey).—Textile Manufacturer.

PREPARING NEW ZEALAND FLAX.

The leaves of the New Zealand flax (Phormium tenax) have been worked up hitherto only to a material suitable for cordage and coarse sailcloth, but no fibre capable of being spun for the manufacture of fine fabrics has been obtained from these leaves. Recently, however, a German chemist has discovered and patented a method of working the fibre and spinning from this New Zealand flax.

The manufacture is conducted as follows: The brown edges are removed from the fresh green leaves and the latter are boiled in a solution of an alkaline salt, for which purpose they may be conveniently tied together in bundles. Suitable salts are borax, soda, or sodium bicarbonate. In particular it has been found advantageous to boil the leaves for one hour in a solution containing 0.5 per cent. of sodium bicarbonate, about 8 litres of such solution being used per kilogramme of leaves. The moist and warm leaves are then beaten with wooden hammers until the parenchyma has been loosened and opened up. To separate the parenchyma from the fibres the mass is next washed in warm soap and water and the fibres afterwards heckled. The product is now suitable for spinning, which is best performed while the fibre is moist.

The fibre thus obtained is white and applicable for fine fabrics, being characterized by great strength. The separate operations in the process described above are well known in the treatment of textile fibres, but the manufacture as a whole for the first time renders possible the production of a fibre from New Zealand flax which is applicable for making the finer kinds of fabric. Moreover, the yield of fibre is said to be considerably higher than that obtained by other methods.—Textile Manufacturer.

Questions and Answers.

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD RECORD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

For reply to questions that are not of general interest to readers of textile journals, such as those relating to the composition of yarns, analysis of fabrics, etc., we will charge the enquirer with the cost of the investigation.

Nets for Soaking Silk.

Editor Textile World Record:

In the article on Silk Throwing in your August issue, mention was made of mesh nets for soaking silk. Where can I procure these?

Throwster (370).

We learn that these nets can be purchased of the Collins Bag Co., West, Jay and Caroline Sts., New York City. They are manufactured by H. & G. W. Lord, 111 Commercial St., Boston.

Change of Speed.

Editor Textile World Record:

I have on my card a 130-tooth driven draft gear. What percentage of difference in speed results from changing the driving gear from 18 to 13 teeth? Cogwheel (369).

If the driver is connected directly or by a direct chain of gears with the driven gear, 130 turns of an 18-tooth driver will drive a 130-tooth driven gear 18 turns. With the same connection 130 turns of a 13-tooth driver will drive a 130-tooth driven gear 13 turns. The reduction in speed by the change is 5 turns for each 18 turns with the 18-tooth gear, or 27 7/9 per cent. If the change is made from a 13 to an 18-tooth gear the increase of speed will be 5 turns for each 13 turns with the 13-tooth gear, or 38 6/13 per cent.

Bleaching Cotton Yarn.

I have had considerable experience in bleaching cotton yarn and have found the circulating process to give excellent results. The streaks referred to might be caused by not boiling the goods long enough in the kier. I have been very successful with the following method:

Boil in the kier eight hours with 2 per cent. of caustic soda, then flood the kier till the yarn is thoroughly cold. Then place the goods in the chemic vat at 1 1/2 to 2° Tw. for about three hours. If the yarn is put in first the chemic should be circulated to cover the yarn. Wash thoroughly, then sour in oil of vitriol at 2 1/2° Tw. for 1 to 1 1/2 hours, then wash, soap and blue to shade. Good boiling of the stock in a good caustic soda is the main point of bleaching, as the gum must be taken out of the yarn before it can be bleached. If the yarn is not boiled long enough it will be streaky and then the boiling and bleaching process will have to be repeated. The yarn will not be tender if the process is well worked.

Granite.

Carding Unscoured Wool.

Editor Textile World Record:

I use wool that shrinks from 10 to 20 per cent and do not scour it before carding. I put the grease wool through the picker in the usual way. What advantage would there be in scouring the wool before picking? When I put the grease wool through the cards is there not a tendency to choke the cards?

Mexico (336).

Carding unscoured wool is contrary to all the accepted theories of manufacturing and is also contrary to all the lessons taught by experience. In special cases where the yarn or cloth is sold or worked unscoured, such as in the case of some grades of stocking yarn, there might be some advantage and profit in working light shrinkage wools without scouring. Generally speaking, however, the natural grease in the wool should be removed before attempting to card it as the presence of this grease on the fibre clogs the machinery, makes the work run badly, and makes it impossible to scour the finished goods properly.

Production of Wool.

Editor Textile World Record:

Where can I get statistics regarding the world's production of wool? Blackstone (364)

There are no very recent statistics regarding the world's production of wool. An article on this subject appeared in the Textile World for February, 1902, and another in February, 1903.

Cockles.

Editor Textile World Record:

We are making cotton warp shoe cloths that are fulled hard, and are having serious troubles with cockles and uneven widths. The filling is made from a mixture of wool, cotton and shoddy. Please inform me as to the probable cause and a remedy.

Gordon (350).

The most common causes for cockles are uneven mixing of stock and uneven weaving. Where several grades of stock are irregularly mixed in the

picking room, such variations are likely to be found in the yarn. If the material is doubled but slightly on the card, the irregularity of the mixture is still more likely to be found in the yarn. This unevenness in the warp yarn causes no trouble in fulling because of the thorough doubling or mixing of the batch in warping. Usually the filling can be doubled with not more than four shuttles, often with a less number. As some bobbins contain more wool, cotton or shoddy than others, the result is that these variations are found in the cloth, causing cockles and uneven widths, some parts fulling more rapidly than others. The remedy for the trouble is obvious; mix the different kinds of stock evenly in the batch. When this cause is suspected, the question can be readily decided by mixing carefully and spinning a small batch, say 300 or 400 pounds, sufficient to weave a few cuts. If the cloth woven with this batch fulls irregularly, the cause probably lies elsewhere.

Irregular weaving caused by slipping of the beam or bent beams may cause cockles. Usually this can be determined by counting the picks in the wide and narrow places, also by a more or less regular recurrence of the cockles. Among other causes may be mentioned coarse and fine yarn and uneven twist.

Common and Glauber's Salts.

Editor Textile World Record:

Would you be so kind as to advise what are the relative results of the use of common salt as compared with the use of Glauber's Salt, in connection with cotton and hosiery mills? If the results of Glauber's Salt are superior to those of the common salt, would the advantage be sufficient to warrant paying, say, $2.00 per ton more for the Glauber's Salt than for common salt?

Manchester (367).

This question has been referred to a chemist and dyer of long experience who replies as follows:

Glauber's salt (sodium sulphate) and common salt (sodium chloride) are both extensively used in the dyeing of direct cotton colors. Their relative merits for this work may be considered an open question, their use in any case being more or less dependent upon the fancy of the dyer and the letter of instruction from the dyestuff manufacturer, than from anything else.

The object of the use of such a compound is to have present in the dyebath some neutral salt which will facilitate the absorption of the dyestuff, and these are used in preference to any others on account of their cheapness.

Glauber's salt comes to the market in two forms, anhydrous or calcined, which has the simple chemical formula Na_2SO_4, and the crystal form which contains 55.9 per cent. of water of crystallization and is represented chemically as $Na_2SO_4+10H_2O$ In other words, it contains ten molecules of water for every molecule of actual sodium sulphate. A given weight of calcined Glauber's salts is consequently equivalent to more than double its weight of the crystalline form.

By some it is considered that in the dyeing of the direct cotton colors a given weight of the calcined Glauber's salt is equivalent to one and one-half times its weight of common salt or sodium sulphide. We may therefore take the following as the relative value of the three.

Calcined Glauber's Salt (Na_2SO_4)		Crystal Glauber's Salt ($Na_2SO_4 + 10\ H_2O$)		Common Salt (Na ce)
100 pounds	=	220 pounds	=	150 pounds

Crystalline Glauber's salt is commonly cleaner and purer than any of the commercial varieties of common salt and for this reason is much better to use in the dyeing of delicate shades. For dark shades it makes little if any difference which is used, and unless it is determined by experience or experiment that one gives better results than the other in any particular case, it is economy to use whichever can be obtained the cheaper. It is well to remember that the calcined Glauber's salt, although cheaper than the crystalline variety per equivalent, is difficult to dissolve as compared with the former. Crystalline Glauber's salt also dissolves more readily than common salt.

In dyeing wool in an acid bath Glauber's salt is always used, as common salt in combination with sulphuric acid liberates hydrochloric acid, the presence of which should be avoided in a boiling dye bath.

A Physiological Defect in Card Grinding.

Editor Textile World Record:

Did you know that card grinders usually grind more wire off on the right side of cards, seen from the doffer, than on the left side? I have seen the difference to be as much as 3/16 of an inch. This is due to the fact that most people hear not so well with the right ear as with the left. When the grinder sets the emery wheel by ear, he makes it bear harder where he listens with the right ear, so as to hear the same degree of noise as on the left side, where he listens with the left ear.

When the wire on one side is ground down to the knee, you have to throw away the card clothing, although the other side be good for two years more. To be safe, the listening should sometimes be done with each ear, and if any difference is detected, it should be taken in account in setting.

Listener.

KNITTING DEPARTMENT.

For Knitting Mill Machinery, Equipment and Supplies, see pages 232 to 253. Also Buyers' Index.

KNIT GOODS SITUATION.

A waiting state describes the condition of the knit goods situation today as regards spring goods. There are no buyers in the market, and, while the business is fair, so far as it has reference to first orders, still no one believes that the full complement of orders has as yet been placed. Some firms have done scarcely anything on spring business, and others have bought so sparingly that they must yet make large purchases before they fill their requirements. A number of manufacturers are open for business and have their prices at their tongue's end, but here the matter rests.

Of course the concerns that are putting off their purchases are under the impression that lower prices will come with the beginning of the delivery of yarn from the new cotton crop, but there is nothing in the immediate outlook to indicate that manufacturers will be able to buy their supplies at much less than the prices of the last four months. The timidity of buyers has had the effect of enabling manufacturers to scatter their product through a much larger area than would have been possible otherwise, and when the demand for duplicates comes many underwear departments will be short of merchandise. Some lines of lower priced balbriggans and cheap grades of ladies' ribbed vests are fairly well sold up, and the manufacturers are now speculating as to how they can be delivered at the prices for which they are sold. Many of this class of manufacturers have gambled and sold their product without being covered on yarn, and there is likely to be trouble when delivery time comes.

Jobbers are all out soliciting spring orders, and several of them report a good business so far. They state they have no difficulty in getting the 2 1/2 to 7 1/2 per cent. advance on desirable lines, as retailers have had it thoroughly impressed upon their minds that cotton is cotton for the past few months.

Our attention was recently called to a line of men's summer weight white shirts and drawers, made by a new concern in Philmont, N. Y., with the gussets in the sleeves of the shirt and crotch of the drawer made of a mesh cloth. These manufacturers have applied for a patent on this feature, and we have no doubt there will be considerable business done on same.

We present herewith, in Figs. 1 and 2, illustrations of two imitation hand-embroidered vests mentioned in our last issue. These are made by a New York State manufacturer, and may be retailed at 50 cents each.

FIG. 1.

It is astonishing to note the sightly goods our domestic manufacturers are showing in low priced lines. Fig. 3 shows a garment made by a western manufacturer, which can be retailed at 10 cents each and pay a fair profit to jobber and retailer.

The situation on fleeces may be regarded as generally satisfactory, although the demand for duplicates at the higher prices asked is naturally restricted.

The buyers report an increased call for ribbed goods and merinos, and say the trade are taking them in limited quantities in place of fleeces, but the intrinsic value of a fleeced garment ordinarily retailed at 50 cents is so great that customers will demand them for some time to come. This season there have been very few fleeces sold at over 50 cents, and as a consequence there has been an increased demand on flat wool goods, and today it is a difficult matter to get prompt deliveries on same.

We have recently had an opportunity of seeing some ladies' 25-c. peeler ribbed goods

FIG. 2.

that had been delivered and returned by the retailer. A complaint had been made to the manufacturer, who replied as follows: "The yarn is dirty and we admit it, but it is a case of take that or nothing." It is our impression that this buyer will give this manufacturer a wide berth when looking up another season's business.

HOSIERY.

The full quota of orders on spring hosiery has not yet been placed, but buyers are not anxious to complete their purchases, preferring to await possibilities consequent upon the expected reduction in raw material.

Low priced lace goods have not sold well so far, although the better grades have been taken in good quantities.

Embroidered goods find fairly ready sale, particularly small neat patterns.

Gauze goods are being sold largely, and it seems as if manufacturers cannot get them too light and thin to meet the buyer's demands.

There is no better evidence of the fact that people have money to spend than is found in the increased demand for finer grades of hosiery. Makers of silk goods report an increase of nearly 50 per cent. on their sales, and say that merchants who never sold silk goods before are now buying them, while the old customers are increasing their orders and also buying more expensive grades.

CHEMNITZ REPORT.

The market is still quiet and very few buyers are in town at the present time.

Manufacturers are to a great extent well sold up to the end of the year. In 33 gauge and 36 gauge goods, some of them demand until the latter part of February for delivery, and will not take any orders for an earlier date.

Prices for goods wanted for early deliveries are firm and will not go down any before spring, even if cotton should fall off in price. For such goods as are wanted later on, slight concessions are made by some makers, while others do not care to contract for long term at all, owing to the uncertainty of the yarn market.

Tan shades have been bought lately more than last year, and it looks as if these were to become quite popular for next season. The orders received so far call for more men's goods, but the demand for ladies' goods is growing also. The shades chosen are lighter than those bought last year, and have a more yellowish hue than bronze.

In fancy striped hose the market is very quiet, and the trade on this class of goods will be rather limited this season.

Extracted and injected styles on black or tan grounds are becoming popular. One of the leading houses is buying colored goods with two tans, two greys and two cadets to the box, which makes a very handsome assortment.

Glove makers have to ask higher prices for

the duplicates coming in for cotton as well as silk goods, as the yarns are higher and the old contracts are used up.

The production of the double woven finger tipped gloves in silk is this season larger than ever, and a number of new machines are set up so that duplicates can be placed, but as a rule at a figure quite a little higher than that for which orders were placed in the early part of the season.

Several importers have also been buying ringwoods for this fall season, and manufact-

FIG. 3.

urers live in hopes that they will again be more in demand. Goods that have to be made would cost a good deal more money, but as in the staple lines rather heavy stocks are still in the market and buyers will be able to get the goods without advances.

A large business is this season done by the manufacturers of ribbed vests, and one of the leading makers is already supplied with orders to run to the end of February, although he has several new machines so that his output is much larger than that of last year.

According to statisticians the annual consumption of woolens by civilized peoples amounts to $1,275,000,000, and of cottons to $1,162,500,000.

"SETTING UP" AND CARE OF SPRING NEEDLE MACHINES.

BY F. W. HERINGTON.

(Continued from May.)

Before putting on the needle cylinder, the stud on which the cylinder revolves, as well as the bore of the cylinder, should be thoroughly cleaned with benzine, and then the stud well oiled.

When the cylinder is put on see that it revolves freely on the stud; if it does not, get a little powdered emery, take off the cylinder and put a little of the emery on the stud with a little oil, then replace the cylinder; if it is too tight to revolve, place some pieces of wood at the bottom for the cylinder to rest upon, put on your driving belt and allow the cylinder to run for perhaps an hour; this will smooth any rough places that may be left either on the stud or in the bore of the cylinder. Remove the cylinder again and thoroughly clean out as before with benzine, then replace the cylinder and if it does not freely revolve then, repeat the operation with the powdered emery, etc., until you have the cylinder revolving freely and also running true, when it is ready for putting in the needles.

The needles are cast in a mould which is furnished by the makers of the knitting machines, and made for the gauge required. Usually two needles are cast together in the mould, although in very coarse gauges only one needle is cast at a time.

The needle metal used for casting, is composed of a mixture of lead, tin and antimony; about 7 parts of lead, 2 parts of tin and 1 part of antimony make a good needle metal, and it is also a good solder for the knitting room, where some soldering is often done. Some knitters use only the lead and antimony the parts varying according to the general ideas of the knitter, from 8 to 12 parts lead to one of antimony.

The needle metal is melted in an iron pot, heated over a stove burning coal or gas. An iron ladle is used for pouring the metal into the mould.

If the lead is hot and still the metal does not run freely enough, the difficulty can be

remedied by smoking the mould over the gas flame. Each needle is placed in the mould separately. Before closing the mould see

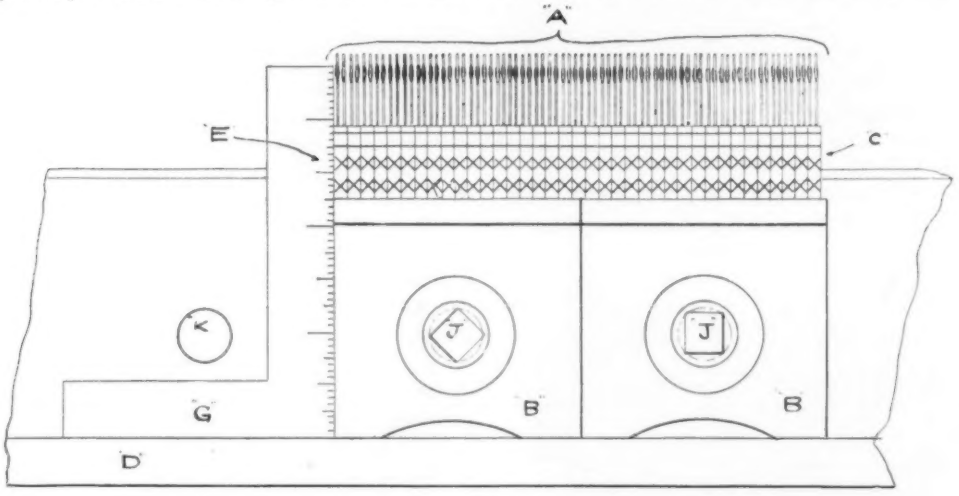


FIG. 40

that both needles lie parallel and that the points of the beards are even with each other. When taking the leaded needle from the mould be careful not to bend the needles.

After all are cast, the ends must be cut off with a pair of cutting pliers, and cut sideways of the leaded needle, so that the bur on the leads caused by the cutting comes in front of the needle and not on the sides, which would prevent them going close together when putting them in the cylinder. It is very important when using leaded needles in spring needle knitting that the mould should be in good condition. Conform as nearly as possible to the circle of the cylinders used. It is best to have every needle thoroughly inspected before they are put in the cylinder. See that each needle faces to the front, and that none of them turn either to the right or left, that both the needles in each lead are equal in length out of the lead, and that there are no burs of lead either on the sides of the leads nor between the needles where they project out of the leads; if any are found they should be trimmed out with a jack knife.

Then lay the needles all together on a small board for convenience in picking them up when putting into the cylinder.

Now remove all the needle caps, Fig. 40 "B" from the cylinder, and clean out with benzine the groove of the cylinder in which the needles are held. Commence by taking one of the needle plates and fastening it tight to the cylinder, at the same time seeing that the bolt, Fig. 40 "J" comes squarely

FIG. 41

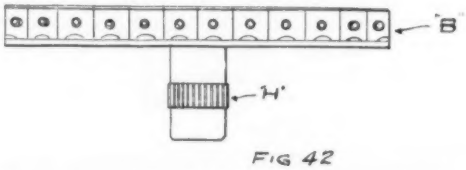


FIG 42

in the centre of the hole of the needle plate, "B", which is made larger than required for the bolt so as to allow a side adjustment of

the plate, and to prevent the screws crowding on the sides of the needle plates.

Also see that every additional plate as put on comes in the centre of the hole, as it will be found that the needle plates vary a little in their width, and if one that is a little too wide crowds the bolt at either side of the hole, change it for one a little wider or narrower.

After making the first plate fast, proceed

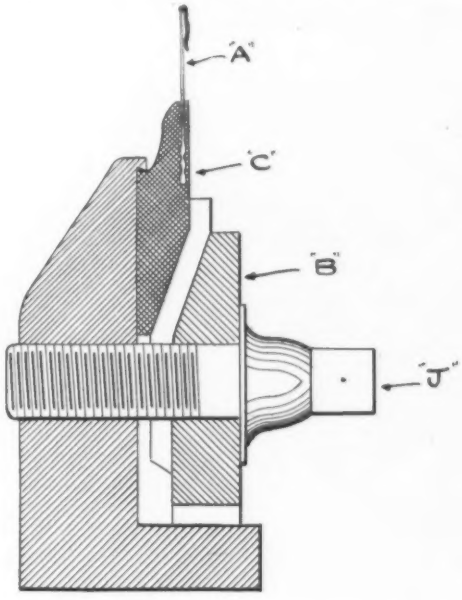


FIG. 43.

to put on another plate and screw it partly up, then take up from the board between the fingers of the left hand about enough leads to fill up a plate, holding them well up against the groove in the cylinder and sliding them along between the cylinder and the plate: screw up the plate, but not too tightly; then with a try square Fig. 40 "G" resting on the rim Fig. 40 "D" of the cylinder on which the needle plates rest, see that the needles are plumb (Fig. 40 "E"). Tighten up the plate.

Now remove the first plate that was put on and see that the first plate of needles are plumb with the try square as before, on the right hand side of the needles Fig. 40 "C."

If the needles are plumb on one side and not on the other, then something is wrong, either with the mould or in putting in the needles, and it may be that every needle is not close together at the top or bottom, or a small piece of needle metal has got between two of the leaded needles; if so they should be removed and examined, and then put in again, and if not plumb then, the mould must be out of order, making the leads thicker at the top or at the bottom as the case may be.

If plumb on both sides, you may proceed to put in another plate of needles, turning the cylinder the way it runs, viz., from the left towards you, always plumbing up every plate of needles with the try square "G" before thoroughly tightening up the plate. It is important that all the needles in the cylinder should stand plumb with the cylinder, otherwise it will be impossible to adjust the wheels so as to have them run properly. If, when putting the needles in, they should not come exactly square each time, a slight tap on the try-square either at the top or bottom of the lead on the side will usually bring them right, provided they were square at the start.

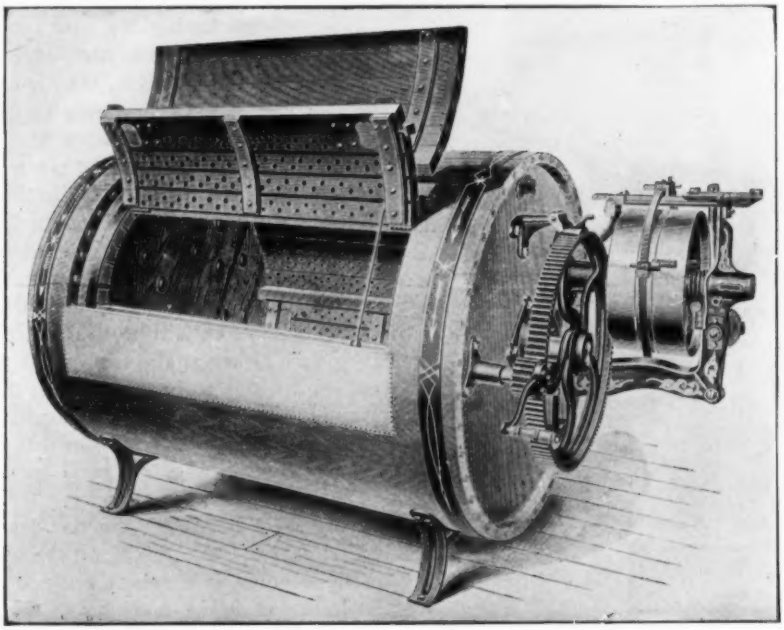
Fig. 40 represents a section (full size) of a needle cylinder, Fig. 41, with two plates of leaded needles in the cylinder. "B" "B" are the needle plates, "A" the needles, "C" the leaded part of them. XX on the leaded part of the needles, is a raised projection cast in the lead, and is the marking of the gauge of the mould, the gauge represented being No. 20. "G" is the try-square resting on the rim of the cylinder, "D," on which the needle plates, "B," also rest. "J" is the needle plate screw or bolt. "K" is the screw hole in cylinder for the screw "J."

Fig. 41 is a plan view of a needle cylinder and Fig. 42 a side elevation of the same. "B" the needle plates and "H" the driving gear of the cylinder. Fig. 43 is a sectional view of the needle cylinder, Fig. 40, and shows how the leaded needles are held in the cylinder, the shaded part back of the needle plate "B" being the leather part of the needle plate "B" which is secured to the needle plate at a point below the screw "J," the leather coming in direct contact with the leaded part of the needles "C." The letters on Fig. 43 correspond with the same parts in Fig. 40.

KNIT GOODS WASHER.

One of the most important branches of knit goods manufacturing is the proper finishing of the product.

The Empire Laundry Machinery Co., whose works are located at Newton, Mass., and general offices and salesrooms at 178 Purchase St., Boston, have been for a number of years builders of a line of machinery which plays a prominent part in the washing, fulling, rinsing, dyeing and bleaching department, and a number of representative hosiery and knitting mills, dyehouses and bleacheries throughout the country have an equipment of their make.



The illustration on this page shows an improved automatic reversing machine for washing, scouring, fulling or dyeing, which they have brought out. Many of their customers, after giving it a thorough trial, have found it so well adapted for its purpose that they have duplicated their orders and in some instances ordered many times.

Machines of this character and their uses are so well known to manufacturers of knit goods that a detailed description, beyond the illustration, is unnecessary. The builders claim that the very best workmanship possible is put on the machine and it is equipped with all the latest appliances for convenience, and their principal guarantees are that both quality and quantity are obtained from its use.

In addition to the machine described above, they manufacture a full line of extractors, with baskets 20, 26, 30 and 36 inches, with countershafts attached or detached; mangles, dryers and a general line of machinery for this particular branch of the industry.

THE FIRST KNITTING BY POWER.

BY HUGH P. GRAHAM.

In the Egberts and Bailey Mill, Cohoes, N. Y., shown in the accompanying illustration, the first principles of knitting by power was successfully applied in the world. In the year 1832, Timothy Bailey succeeded in operating the old hand knitting frame by power, and in the same year formed a copartnership with his brother, Joshua Bailey and Egbert Egberts. Egberts agreed to furnish the capital and Timothy Bailey, a practical mechanic, his ideas and improvements on the new power

frame. At first, it was an up-hill struggle, but with perseverance they were most fortunate, and in the year 1843 commenced the erection of a mill. For many years this mill was the only one used for power knitting in the world.

The original building was of brick, 124 by 45 feet, and was three stories high. In the year 1843, Timothy Bailey withdrew from the

firm. Joshua Bailey and Egbert Egberts continued the business until 1852, when Mr. Egberts withdrew. Joshua Bailey continued the business, organizing the Bailey Mfg. Co., which went out of existence in 1863. Since then the mill has had various owners and is now used as a shirt factory.

Holes in Knit Goods.

Editor Textile World Record:

I have had trouble with my knitter in knitting wool yarn; it makes frequent holes in the work. Will a ribber knit as soft yarn as a plain circular knitter, or is the trouble caused by improper adjustment? Yellowstone (366).

A practical knitter answers this question as follows:

Replying to the above question would say that we understand the correspondent means by a plain circular knitter one using latch needles the same as the ribber.

From my experience would say that a ribber can be made to knit as soft yarn as the plain, circular knitter, but I do not say that all ribbers will do so, because it depends very largely on the construction of the ribber, as well as the proper adjustment of it.

In a ribber there is more strain on the yarn in forming the loops than there is in the plain stitch. The ribber must be adjusted, therefore, to relieve the strain all that it is possible to do, by adjusting the dial of the ribber.

In all ribbers using a flat dial, the loops for the cylinder are formed by drawing the yarn over the dial needles, and these loops must be long enough to allow sufficient yarn for the loops of the rib stitch to be formed by the dial needles; it therefore follows that the dial stitches are formed by "robbing" as it were from the cylinder loops or stitches, and it is this "robbing" where the greatest strain comes in on a ribber.

To relieve this strain as much as possible, the drawing back of the dial needles to form the loop must occur at the same time as the cylinder needles are coming up, so that the strain of the cylinder needles upon the loops are relieved at the same time that the strain starts by the drawing back of the dial needles. In some ribbers the cams are not constructed so as to adjust the machine to do this.

Yellowstone should give careful attention to the following points in working soft yarn:

1st. Have the dial down as low as it is possible to get it, and leave room for the cloth to go down.

2d. Adjust the stitch or drawing cam so that it will not draw back any more than is necessary to cast off the loop.

3d. Set the dial cam ring either forward or backward, so that it will draw the stitch only as the cylinder needles in coming up releases its pull upon it.

If the setting forward or backward of the dial cam ring causes it to be out of position as regards the yarn guide, or throws it out of position for the yarn which is being fed to the cylinder needles, then the cam in the cylinder ring must be changed so as to bring the needles of the cylinder up at the right time.

In some ribbers I have found that the dials have been made about 1/64 of an inch too small in diameter, and this has been sufficient to cause the cutting of holes, not only in soft yarns, but also in those which have more twist and are stronger, because, even after the cylinder needles have "come up" the dial needles have yet to draw on the stitch, in order to cast off the loop. This can readily be ascertained by turning the machine slowly, and noticing if the strain is still on the stitch, even after the cylinder needle has come up to its place, and if the pull is still on the stitch, one may be sure it will cut holes when the machine is running.

MANAGEMENT OF A KNITTING MILL.

BY FOREMAN.

(Continued from September.)

The next room visited was the finishing department in which several girls were pairing and mending, and the mending was in evidence as far as the eye could see. The man having charge of this department informed the new super that it was impossible to do anything with the help they were so independent. When he told what wages the girls earned the reason was only too apparent, as they could do better almost anywhere else, and about the only inducement they had to remain seemed to be that the mill was convenient to their homes and for this reason it was, of course, the most undesirable that stayed in preference to going further and earning more. On investigation it was found that the price paid per dozen was about the average, but it took so long to get anything done that the results were small. Eighty per cent. of menders were thrown out, and the uneven lengths made it impossible to get out anything like a day's work on pairing, even with expert help. The other departments were in a similar condition.

As a good example of the discipline used, the new superintendent, while inspecting some of this work, had his train of thoughts switched suddenly to another track by the tones of a street organ and simultaneously a scurrying of feet on the floor above. Another investigation showed that all the help had left their machines and were at the windows with their heads out to see what was going on. The man in charge of the room when asked for an explanation simply said that they always did it and nobody could stop them. The excitement finally subsided on the disappearance of the musician and they straggled back to their places. By this time it was nearly noon and having a desire to see in what kind of order the help left the building the superintendent went to the knitting room about fifteen minutes of twelve and found the machines stopped, all the hands with their hats on, some at the head of the stairs and others standing close by, waiting for the bell to ring. Though none left the building until the door was unlocked at the stroke of the bell, no work was done after eleven-forty and the same performance was repeated at night, the man in charge of the room again informing the superintendent that they always did it and it could not be stopped. As there was only a few days before stock taking he was told to run things as he had been accustomed to, but after a new start was made, things would be conducted differently, which remark was taken with rather poor grace.

Next day he noticed a knitter take a cone of yarn from her machine and replace it with another. He asked what was the matter with the one taken down and she told him that it was too thick and would not run. He asked how she found out which was right, and she volunteered the information that the yarn often got mixed and then they kept trying

first one bobbin and then another until they got one that was right.

The few remaining days passed by and with them the assistant fixer. A new man was put in his place and as soon as stock taking began the work of straightening out the machines in the knitting room was taken up in earnest and by the time they started again several sets of machines were in running order, a reel and scales had been purchased, odd cones of yarn had been reeled, the number marked on the inside of each cone, and put in the cases where they belonged, places made for each number of yarn, all waste and imperfect work cleared out of the knitting room and put into a spare room to be gradually disposed of, a set of rules printed and posted up in conspicuous places and the knitting room put into the best possible condition that the short space of time would permit.

When the help returned, the first thing they noticed was the changed appearance of the room, the next was the printed rules which caused considerable talk, "prison rules," they called them, and many remarks were made to the effect that the superintendent would have some trouble when he tried to enforce them. The first morning found the new superintendent with his coat off and at work in the knitting room as if it was the only room in the mill, just an occasional visit being paid to the other departments. Close attention was given to the machines which had been overhauled to see that they were properly adjusted, and as one girl expressed it they did not seem like the same machines. In the meantime the others were being thoroughly repaired as rapidly as possible.

As the noon hour drew near there seemed to be some movement on foot, and after half past eleven the visits from one to the other increased for about ten minutes, then all the machines stopped, but the help remained at their places as if waiting for a leader. It did not take long to see who the leader was, so approaching this girl the superintendent asked in a pleasant tone why her machines were stopped, and was informed that they never worked after twenty minutes of twelve.

"But I propose to change that custom and have had rules printed to that effect. Have you read them?"

"Yes, but all of the girls have decided not to work any different than before."

"Well, you are making a serious mistake, and I want you to start your machines and run them up to the time for the bell to ring." Still no movement was made to start and all necks were being craned to see what was going on and what the result would be.

"Well, Miss ———, if that is the case, I will give you just two minutes to start your machines or go to the office and get your pay and leave the premises," and with this remark the superintendent took out his watch and waited, but her machines started before the two minutes were up and the rest of the machines followed suit.

Things in general looked better after this and showed a gradual improvement as far as discipline was concerned, but the independent feeling still existed and the help would walk out without the least provocation and at times with provocation. The machines that had been overhauled and were running as they should do, soon began to have a good effect by showing what could be done on all of them in time, although there was some grumbling at first as those who had been running six or eight machines could not see how they could get a living by running four when they had only been able to get out sixteen to eighteen dozen per day with the six or eight. However they soon found that as the machines run so much better they had from twenty-six to twenty-eight dozen to show for their day's work, which meant a big increase in their wages. This made them more contented and not so ready to walk out at the least thing that did not suit their fancy, while the goods made from these machines were of a much better quality, more uniform in length, less menders and caused a general improvement all along the line and raised wages, not by having to pay more per dozen, but by having the goods come through properly and thus making a big increase in the number of dozen each hand in the different departments could get out.

Consequently their wages were raised to correspond with the increased production and

it was then found that the girl who was earning seven or eight dollars per week did not show the independent spirit that she did when she was only earning two or three dollars and could receive a little criticism without going home. At the same time they could not help noticing that the changes made, including the so-called prison rules, worked to their advantage in several ways, the most agreeable one being in the increased size of their pay envelope.

KNITTING MILL NEWS.

New Mills.

*Georgia, Augusta. J. D. Hodges advises us that a new brick building has recently been completed for purpose of manufacturing children's ribbed hosiery. Company will be organized to operate the plant. Will start with about $12,000 capital. Have not yet purchased any of the equipment.

*Georgia, Montezuma. The Montezuma Manufacturing Co. expect to have their new knitting plant ready for operations about Jan. 1st, 1904. They will start with twenty knitting machines, making women's underwear. They will increase the capacity to 500 dozen daily as soon as the operatives are skilled in the work. Plant will be equipped with a bleachery. E. P. Lewis is president of the company; W. H. McKenzie, treasurer and agent and W. M. Dress, superintendent. E. M. Townsend & Co., New York, will sell the goods.

*Maine, Bucksport. About a dozen machines are now in operation in the branch mill recently established here by W. J. Creamer of Penobscot.

*Massachusetts, Mattapan. Work is almost completed on the new knitting mill under construction for John B. Bartlett.

*Mississippi, Tupelo. The buildings for the Tupelo Hosiery Mills, owned and controlled by the Ely & Walker Dry Goods Co. (St. Louis, Mo.), have been completed and the machinery installed. Ladies' and children's hosiery will be made. Present capacity of the plant is 500 dozen per day.

New Jersey, Jersey City. Max Beckert is interested with his brother, Paul Beckert, in the American Knitting Mills, located at 3211 Hudson Co. Boulevard. Fine knit goods are made.

New York, Hoosick Falls. The E. Z. Waist Company has been organized with capital stock of $25,000 for manufacturing knit fabrics. Frederick E. Haight, Clarence B. Smith and Harry M. Hewitt are interested.

*Pennsylvania, Hazelton. Work has been completed on Wild & Co.'s new mill. The building is 95 by 66 feet, two stories and basement, with separate boiler and engine room, 60 by 50 feet. About 100 people will be employed in the new plant, equipped with 30 knitting and 35 finishing machines.

*Pennsylvania, Lebanon. The Lebanon Textile Co., formerly located at Avon, has erected a handsome new and modern mill, three stories and basement, in the lower part of Lebanon, in which they are putting an entirely new equipment. The main building is 200 by 52 feet, with boiler and engine house in separate building. Arrangements have also been made to put up a dye house, which will enable them to dye and finish the goods before they are put on the market. The officers of the company are president, Samuel L. Light; vice-president, E. Benjamin; secretary, Thos. G. Spangler, and Wm. S. Davis, treasurer and superintendent. The goods manufactured will be ladies' ribbed underwear and specialties, which will be sold through a New York house. The capital of the company is $75,000 and when in full operation will be the largest, most complete and up-to-date plant in the Lebanon Valley.

*Pennsylvania, Reading. J. J. Knoll is president of the Reading Spinning Company, recently reported incorporated at Trenton, N. J., with capital stock of $125,000. James M. Endy is vice-president; W. C. Shantz, secretary, and J. M. Acker, treasurer. The main office and works will be at 8th and Spring Streets. Messrs. Shantz and Acker are now located there, operating the Shantz Knitting Co.

Tennessee, Harriman. The Harriman Knitting Mills have been incorporated with capital stock of $20,000. A. H. Woods and W. S. Woods are interested. They will occupy the old tack factory and will install the latest improved machinery. Yarns will probably be secured from the Harriman Cotton Mills.

*Utah, Ogden. The Home Knitting Co., capitalized at $25,000, manufactures all kinds of knit goods; men's women's and children's hosiery, union suits, garments, shawls, sweaters, etc. Plant is equipped with 15 knitting and 3 sewing machines. David C. Eccles is president of the company; David O. McKay, treasurer, and Egbert C. Stratford, superintendent. Plant is operated by electricity. Goods are sold direct.

Utah, Woodruff. Peter McKinnon advises us that he contemplates starting a small knitting plant of one or two machines and to carry also a full line of Eastern manufactured men's, ladies' and children's union suits, sweaters, hosiery, etc.

Washington, Tacoma. Mr. Joseph D. Adams, 1341 C Street, contemplates embarking in the knitting business in that State, having placed an order for machinery in Philadelphia.

Enlargements and Improvements.

Georgia, Barnesville. The Gem Knitting Mill is to install a bleachery in the plant. This concern makes underwear and hosiery.

*Michigan, Pontiac. The Pontiac Knitting Co. will install about 100 new knitting machines in the new addition recently completed. This concern makes gloves, mittens, hosiery, jackets and the "Pontiac" fulled goods.

New Hampshire, Laconia. The F. L. Holt Manufacturing Co., manufacturers of hosiery, is installing new machinery. They have daily output of 100 dozen per day.

Pennsylvania, Annville. A. R. Kreider & Bro. report many orders for their misses' and men's half hose, 176 needle goods, both lace and embroidered, Maco foot, plain and double sole on 58 knitters. It is their intention to put in 10 new kniting machines in about two months. A new addition has been built to the establishment, enlarging it about one-half, a 50 H. P. boiler having also just been put in. Mr. A. R. Kreider is the superintendent and the goods are sold direct.

Pennsylvania, Avon. Messrs. Light & Bomberger are extremely busy on half hose, 144 needle goods, with 18 knitters, 4 ribbers and loopers, turning out 500 dozen a week of finished goods. Mr. Light reports that they have taken contracts which will compel them to run one year on full time. He also anticipates making improvements in the way of adding 12 or 15 more ribbers and several knitters for the manufacture of misses' hose. Mr. Light superintends the running of the plant.

*Pennsylvania, Coopersburg. Henry Gabriel's Sons will instal new machinery in the branch mill here, as needed. The plant will be started with new machinery now in the Allentown mill. Fine gauge goods will be made, operations to begin as soon as possible.

Mills Starting Up.

*Mississippi, Tupelo. Operations have begun in the Topsy Hosiery Mills, established here by the Eli-Walker Dry Goods Co., of St. Louis, Mo. After January 1, the number of operatives will be increased to 250, 125 now being employed.

*North Carolina, Henderson. The Balfron Knitting Company has recently been organized with capital stock of $30,000 to operate the plant formerly run as the Seaboard Knitting Mills. Mr. P. H. Brown (of Little Falls, N. Y.), is general manager of the plant. General improvements and necessary repairs are being made to the plant, which it is expected will be ready to start up by November 1.

Facts and Gossip.

*North Carolina, Winston. The P. H. Hanes Knitting Co., recently reported incorporated with capital stock of $250,000, $100,000 paid in, will operate the Hanes Knitting plant here. P. H. Hanes is president of the concern; P. H. Hanes, Jr., treasurer; W. M. Hanes, vice-president. Plant is equipped with 30 knitting and 60 sewing machines, making fleece lined ribbed cotton underwear, for men, women and children.

Pennsylvania, Palmyra. The Palmyra Hosiery Mills report that the scarcity of help has compelled them to turn down orders. They are, however, very busy on low grade half hose on 30 machines, selling the goods direct and through agents.

Pennsylvania, Philadelphia. William Metzger is manufacturing horse nets and mesh knit goods at 1009 Marshall Street, on seven hand looms. Mr. Metzger states that they are very busy and is always on the market for yarns and twines of worsted and cotton.

Pennsylvania, Philadelphia. Mr. David Block, of the firm of Haber, Block & Co., operating the United States Knitting Mills at 7th and Market Streets, has withdrawn from the company. The business will be carried on under the old name by Mr. Morris Haber and Joseph Haber. Sweaters, golf vests and blouses are manufactuured in this mill, with 42 knitting machines, the goods being sold direct.

Pennsylvania, Reading. The Hawk Knitting Co. is reported to erect an additional building during the fall or winter.

Pennsylvania, Womelsdorf. Heister & Hirsch are kept very much on the hustle in an effort to fill their orders for the 176 needle goods which they produce. The goods are sold direct.

Rhode Island, Woonsocket. C. B. Fillebrown has retired as president and general agent of the Glenark Knitting Co. Henry L. Hotchkiss of New Haven has been elected to succeed him as president and Frank A. Morrill of Woonsocket, as general agent and superintendent. Mr. Morrill will continue as a director with the Morrill Knitting Co.

*Tennessee, Knoxville. H. M. Branson, secretary of the Chamber of Commerce, advises us that negotiations of a limited nature have been made, concerning the establishment of a knitting mill here, but nothing definite has yet been decided upon.

Vermont, Bennington. Clark Bros., proprietors of the Superior Manufacturing Co., Hoosick Falls, N. Y., are reported to operate a branch mill at North Bennington.

Personals.

C. B. Bennett of Westbrook, Me., has accepted the position of night superintendent of the Perry Knitting Co., Perry, N. Y.

C. O. Buck of Sherbrooke, P. Q., has taken charge of the winding department in the Sulloway Mills, Franklin Falls, N. H.

Charles R. Simpson, late of Fairfield, Me., is now in charge of card room at A. H. & C. B. Alling's hosiery mill, Derby, Conn.

John Lambert has resigned as carder at the Commercial Mill, Troy, N. Y.

A. Talbert, for many years a boss in the spinning department at the Baltic Mills, Enfield, N. H., has secured a similar position in a hosiery mill at Laconia.

George B. Burras, formerly of New York, is now the superintendent of the Allen Knitting Mill of New Orleans, La.

William A. Eastman has tendered his resignation as manager, to the directors of the Hooper Knitting Co., Lowell, Mass. Mr. Eastman has been in the employ of the Hooper Co. about a year and a half, going there from the Lowell Hosiery, of which company he was also manager.

New Machinery and Processes.

This department is designed to present from month to month a brief mention of new machinery, devices, and processes being brought out in this country and abroad, that are of interest to textile manufacturers. It is not a list of patents, but of improvements coming on the market. The idea being to present to our readers a systematic monthly record of new machinery, etc., of interest to textile mill men.
We invite machine builders and others to send us such information for this department.

Fire Proof Window and Window Frames. David Lupton's Sons Co., 2611 Coral St., Philadelphia, Pa., are manufacturing metal fire proof frames under the H. Collier Smith patents, which it is claimed are absolutely fire proof. They have an attachment which automatically closes the window when exposed to fire. The frame and sash being made of whole sheet metal, glazed with ribbed, wired or prism glass, render the whole impregnable to fire.

Automatic Rib Cutting and Folding Machine. Chas. Cooper of Bennington, Vt., has recently placed on the market a machine for cutting and folding automatically, the various lengths and widths of cuffs and drawer bottoms in general use. The machine can be quickly changed from one width to another as may be desired and embodies all the requirements for which the machine is designed. It occupies a floor space of two feet by six feet, six inches, and has a production of one and one-half dozen pairs of cuffs or anklets per minute.

Cone Winding Machine. The Universal Winding Co., 95 South St., Boston, Mass., is bringing out a new model of winding machine which they call Number 50, "The Twentieth Century." The new Number 50 machine is especially adapted for winding soft spun yarn in conical form for delivery to knitting machines, and for doubling fine yarn for twisting and weaving. This new model machine has important features and improvements which are described and illustrated at greater length on another page.

Shuttle Check. H. F. Livermore, 85 Pearl St., Boston, Mass., is placing on the market a new shuttle check, called the Shirreff check, which is described in another part of this issue.

Embroidery Loom. Otto Walther, Philadelphia, Pa., is introducing into this country a German embroidery loom which works with a needle in combination with a shuttle. Many of these machines are in operation in Germany, where they have largely supplanted the hand machines. A description of the loom appears in another part of this issue.

Cold Air Drying Machine. Frank Bailey of Cedar Brook, N. J., has recently placed on the market a new model of his cold air drying machine for yarn, designed especially for mills requiring large product. Its capacity is from 3,500 to 4,000 lbs. of worsted or woolen yarn per 10 hours, and about one-third less of cotton yarn. A number of these large machines have been placed in establishments where others of Mr. Bailey's machines are in satisfactory use. In this larger machine, some new features and improvements have been embodied, which improve its efficiency. The special claims for this system of drying are fine condition and color of the yarn after drying, and an economy of heat, power and space.

Wool Scouring Rake. F. L. Whitney, San Francisco, Cal., has invented a new wool scouring rake, which it is claimed enables wool to be much better scoured and rinsed than has heretofore been possible. Each fork moves over a distance of about five feet at each forward stroke. The upward movement turns the wool over without splashing the liquor. Two of the machines are now in operation in San Francisco.

Patent Self-Oiling Clutch Friction and Positive Combined. F. L. Smith, of Franklin Falls, N. H., is putting on the market a cut-off coupling and friction pulley which has been introduced and is now being used in a number of mills, which speak highly of it. It is

claimed to have all the advantages of a friction pulley, being a combination of both friction and positive. The friction starts the load and a pin locking device makes it a solid and positive clutch. The value of clutch pulleys is becoming more generally recognized in all textile mills. Descriptive circulars, showing the simple working of the mechanism, may be had upon application at the above address.

Fibre Spools. The Macrodi Fibre Co., Woonsocket, R. I., are putting on the market a line of mill spools and bobbins made from hard fibre. The advantages claimed for this line of goods are indestructibility, perfect balance, lighter weight, and better and more lasting finish. They have been given a thorough trial in a number of cotton mills with very satisfactory results. The persons connected with the business are thoroughly familiar with mill requirements, and have aimed to turn out goods which will meet the exacting conditions of hard mill usage more satisfactorily than wood.

Fibre Bobbin. The Macrodi Fibre Company, Woonsocket, R. I., are about to engage in the manufacture of a new fibre bobbin. The socket may be of either wood, paper or fibre as desired. The heads are of vegetable fibre specially prepared and hardened, and are warranted not to warp, chip or break with the hardest usage.

AN IMPROVED EXPANDING COMB.

The expanding comb or reed for warpers was invented nearly sixty years ago, and since that time many improvements have been made in it to increase the convenience in handling and the uniformity with which the threads are spread across the beam. The success of the fabric depends in great measure upon the uniformity of the warping, and a reed expanded irregularly is sure to cause trouble by subjecting part of the warp to increased tension. This makes bad work in weaving and imperfections in the finished goods. One of the chief causes of this irregularity is the dust or fly working its way into the comb boxes and clogging the wires so as to prevent their moving easily when expanding or contracting.

With a view of removing these difficulties the T. C. Entwistle Company, Lowell, Mass., have built an expanding reed which is now offered to the trade with the confidence that it will not only do better work, but that it will be found more convenient to handle than the ordinary type. This comb is the invention of A. E. Brooks, who is connected with the T. C. Entwistle Co., and has had eighteen years' continuous experience in the making of combs of this kind and made a study of all the strong and weak points of yarn combs.

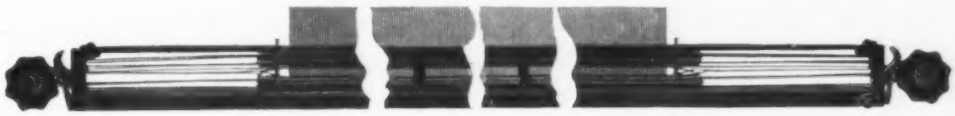


FIG. 1.

Winding Frame. J. Horrocks & Son, Manchester, England, are placing on the market an improved winding frame, the invention of Mr. Horrocks of the above named firm. The principal feature is in the construction of the traverse motion which is designed to loosen the strain on the thread during quick traverse and also to ease the motion at the point where the guide reverses. It is said that the machine will run 130 strokes per minute without difficulty, producing cheeses that are perfectly parallel, and that the construction is such that no wear and tear will affect the shape of the spool.

The result of his experience is embodied in this new device.

As it is obviously impossible to construct a reed box so tight that flyings cannot get inside, the new reed shown at Fig. 1 has been built in an open iron frame work, leaving the springs and working parts exposed so that they can be cleaned without difficulty. When the parts are hidden the operator is not aware of the real condition on the inside of the box, and as a consequence runs the reed long after it should be taken apart and carefully cleaned. As the threads coming from the creel pass over the iron frame work of the reed there

is no necessity for either brass or glass rods, such as are used to protect the wood work of the ordinary reed.

Several improvements have been made in the method of adjusting the reed when operated by a tape. Formerly the operator fastened the set screw with one hand and then with the other hand wound up the end of the tape by means of a wheel. If, during this operation, he happened to lose his hold of the hand-wheel, the spring would jerk the reed in, breaking the ends which are held by the stop motion. This difficulty has now been entirely obviated and the adjustment made much easier by a ratchet wheel, shown in the rear view of the comb at Fig. 2. When expanding the comb the operative simply turns the hand wheel; the ratchet, held in place by a spring, prevents any possibility of a reversal of the motion. When contracting the comb he takes hold of the hand wheel and as the ratchet is raised allows the reed to reverse to the desired position.

A change has also been made in the connection of the tape with the reed. Heretofore it has been necessary to have one-quarter turn in the tape between the winding roll and the reed. In this position the tape was very likely to become worn by contact with the iron bracket. In the new reed the tape runs straight from where it is attached to the spring to the roller on which it is wound.

The next improvement to claim attention is the adjustment of the guide wire which is raised from its usual position at the bottom of the reed wires and placed between the two springs. It thus serves to keep the springs apart and at the same time to stiffen the reed.

These expanding reeds are built with either screw or tape motion and with independent adjustment at each end allowing the warp to be adjusted to the beam as may be necessary. The independent attachment with the screw motion consists of separate screws, one for each end. All these improvements can be made in the open or closed comb as desired.

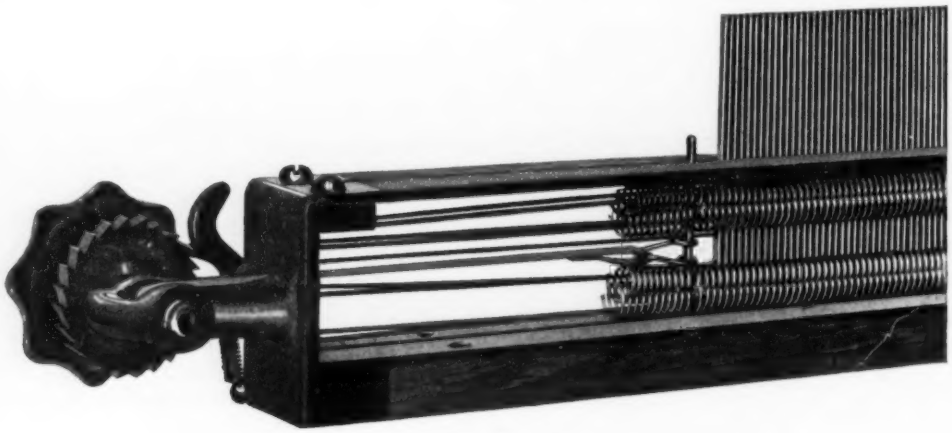
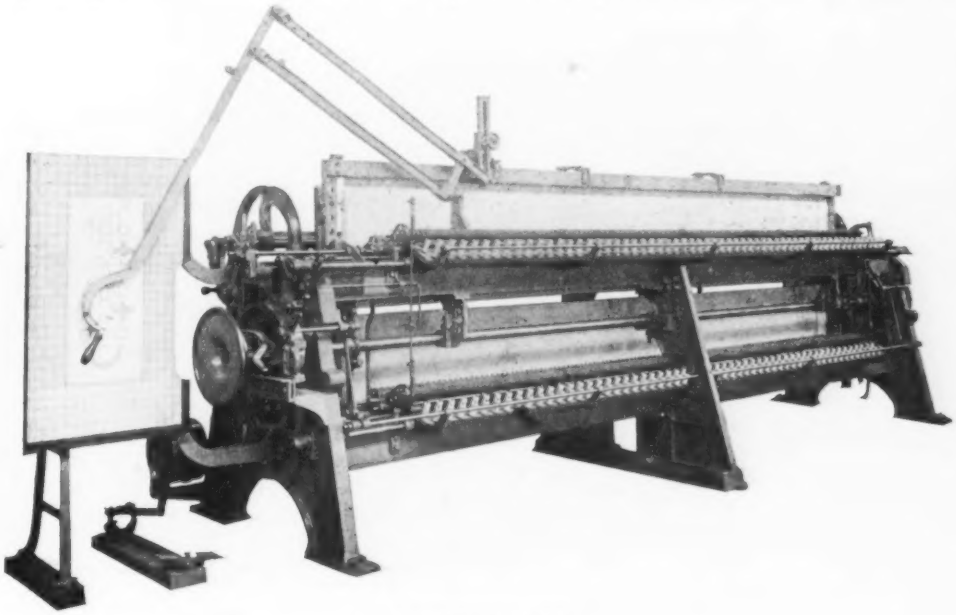


FIG. 2.

One source of trouble with the closed comb is the liability of the box to break at the ends. This has been overcome to a great extent by the use of an end plate or bracket, which projects some distance along the sides of the box where it is fastened with screws which enter the wood work crossways of the grain, instead of lengthways as formerly. None of the improvements which we have mentioned increase the cost, the new comb being sold at the same price as the old one. Several open combs have been run in various mills with very satisfactory results. Patents covering the various improvements referred to have been applied for. Further information may be obtained from the builders, who also manufacture a full line of warping, balling, beaming and long chain dyeing machinery, traverse and roll grinders for cotton, woolen and worsted cards.

LOOM FOR EMBROIDERY BY SHUTTLES.

Among the different machines brought in the market by the Chemnitzer Wirkwaaren Maschinenfabrik (formerly Schubert & Salzer), of Chemnitz, Germany, is a loom for embroidery by shuttles, shown in the accompanying illustration. It is protected by patents in Germany, No. 109,936 and 142,440, and under patent No. 15,731 in Switzerland. The construction of this kind of machine was begun in 1894 by this concern, and so far this year about 100 frames were put in operation in Plauen and the surrounding villages, known as the "Vogtland," the centre of the embroidery industry in Germany.



AN EMBROIDERY LOOM.

Through careful study and close attention given constantly to insure workmanship of the best, a machine was offered with greater productive capacity than any other machine constructed and so the loom was introduced with best results also in Switzerland and France.

Through this shuttle embroidery loom, the hand embroidery machine has rapidly lost all favor. The latter machine works on the principle of hand embroidery; the whole needle goes through the fabric and is brought back to another place according to the pattern; but the needle has two points and the thread has a certain length which is fastened in the eye in the middle of the needle. The shuttle embroidery machine works with two threads, a needle and a shuttle thread, exactly like a Singer sewing machine. It is possible, therefore, to operate this machine with 100 to 120 stitches per minute, while the hand embroidery machine can be operated with only about four stitches in the same time.

The same effects being produced as on a hand machine, and much cheaper, the goods made on a shuttle machine are in great demand, and it is stated that for each hand machine there are a hundred shuttle machines in operation at present.

The goods manufactured on these machines are embroideries on linen fabrics, silk and cotton laces, point nets and etched laces. As the loom is built with two needlebars, each for either 5, 6, 6 3/4 or 7 1/2 yards length of embroidery, the double length of embroidery is obtained after finishing one pattern. The design of the pattern, six times enlarged, is fastened to the pattern board, as shown in the illustration, the operator guiding with the pantograph the fabric, which is stretched on

the frame, in front of the needles. One girl in front of the machine watches the needle thread, another one at the back takes care of the shuttles, and thus one machine gives employment to one man operator and two girl helpers.

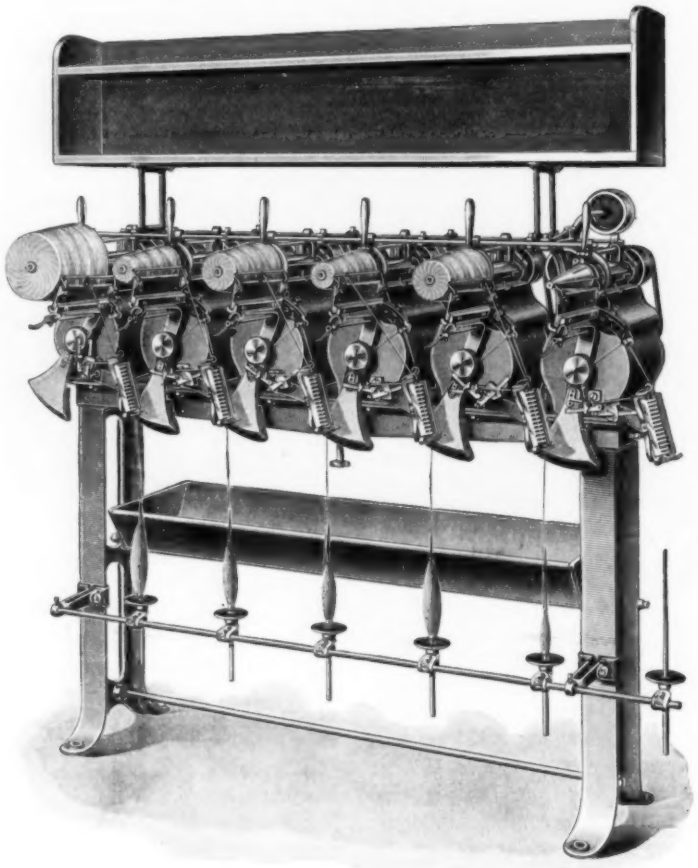
In comparison with other machines in the market, the sliding ways for shuttles are made of steel and hardened, the new movement of the frame, tension of thread and movement of shuttles, secured by double sets of cams, so minimizing wearing off and avoiding repairs.

Otto Walther, 591 Bourse Bldg., Philadelphia, the representative of the builders, will give further information on application.

About 3,000 cocoons are required to produce one pound of reeled silk.

A NEW MODEL OF THE UNIVERSAL CONE WINDING MACHINE.

The illustration shows the new model of the Universal winding machine, which is called Number Fifty, or Twentieth Century machine.



THE NEW MODEL UNIVERSAL CONE WINDING MACHINE.

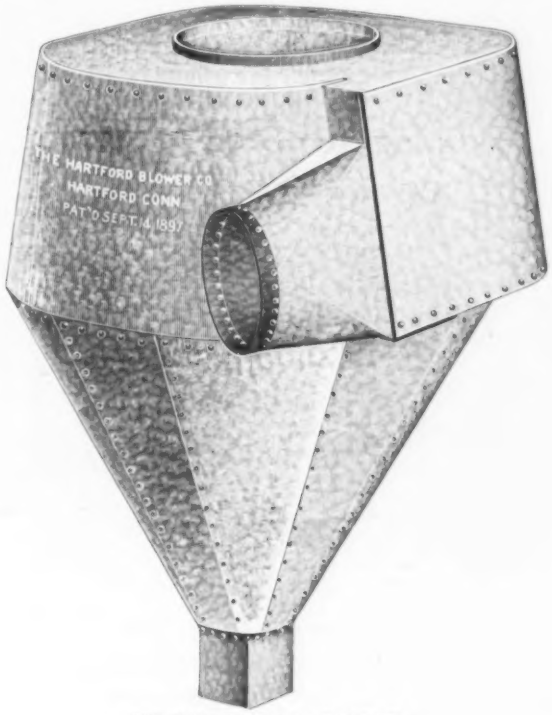
The Universal system of winding has been in extended use in textile establishments for over ten years. It met with mill favor from the first. This system of winding marked a new departure in this branch, and ten years' practical experience with the opportunity for study and observation under exacting mill conditions suggested to the builders improvements, which have been embodied in this new model machine. The objects aimed for have been high speed, large product, small

floor space, the least driving power, least repairs and care, minimum waste, perfect quality of product, put up in most compact and attractive form for varied requirements.

The new Number Fifty machine is claimed to be especially adapted for winding soft spun yarns in conical form for delivery to knitting machines and for doubling fine yarn for twisting and weaving. In winding soft spun yarn it is of great importance that its elasticity and uniformity of twist be retained. Special attention has been given to this requirement by providing a sensitive automatic tension device, which can be arranged for use with the finest yarns so as to avoid abrasion and strain. In this type of machine, the yarn is not drawn over rough felt pads or any rigid parts.

The bearings of the machine are oiled from two supply reservoirs, which are dust and lint proof, preventing the outside of the machine from becoming smeared with oil and removing danger of yarn becoming soiled in winding. The oil passes through the bearings and back again to the reservoirs, being used repeatedly, and thus effecting economy of oil and a saving of time in oiling the machine, while the self oiling spindles are light running, thus requiring a minimum expenditure of power, which is claimed to be only about one-third of that usual in frictional winding.

The Universal Winding Company, whose offices are at 95 South St., Boston, have recently issued a booklet descriptive of this new machine, containing estimates of economies attained through its use and other figures bearing on saving in freight, power, labor, etc.



THE HARTFORD DUST SEPARATOR.

THE HARTFORD PATENT IMPROVED DUST SEPARATOR.

The disposal or quiet disposition of material handled with fans is a problem which presents itself in connection with an exhaust system. As the material leaves the outlet of the fan it is traveling at a high velocity and is closely mingled with the air.

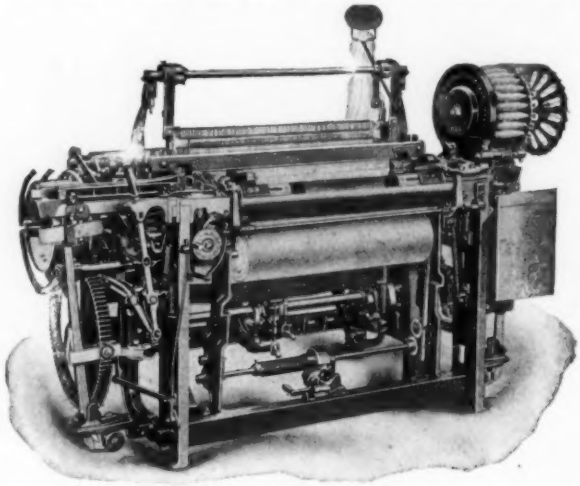
A common method is to blow the material into a room, box, well, or some such arrangement with the result that there is considerable back pressure on the fan, causing unnecessary consumption of power. Dust escaping with the air in many places is a great inconvenience defacing walls of buildings, covering roofs, etc., resulting in great damage from fire. In many places it is a serious nuisance.

The Hartford patent improved dust separator is especially designed for obviating these nuisances, handling all classes of finely divided material of moderate weight such as shavings, chips, saw dust, lint, leather buffings, dust, meal, corn, oats, seeds, cereals, etc. It is so designed and constructed that the heavier material is subjected to the action of centrifugal force and gravity permitting the escape of the purified air at the top into the atmosphere, delivering the material with a whirling motion out at the bottom of the hopper.

This dust separator has been on the market and in use all over the United States since 1897, also in foreign countries, giving the highest satisfaction. It is broadly covered by United States Patent September 14, 1897, for which the Hartford Blower Company have a license for a term of years. Its construction is of the very best heavy galvanized sheet steel, and it is guaranteed to accomplish its work without back pressure. The builders claim that it is better constructed, will work with greater efficiency in every way than any other separator on the market today, without exception.

These machines are manufactured by the Hartford Blower Company, 114 Suffield St., Hartford, Conn., who are the authorized licensees. A letter of inquiry to them will bring full particulars and lowest prices.

This company also makes a specialty of furnishing the most complete exhaust systems on the market today without exception. These systems are known all over the country as the Hartford Exhaust Systems, and anyone contemplating installing a system of this kind will do well to write to the Hartford Blower Co., who will gladly furnish an estimate gratis. A letter of inquiry will receive prompt and careful attention.



A NEW MODEL OF THE DRAPER LOOM.

A NEW MODEL OF THE DRAPER LOOM.

The Draper Co., Hopedale, Mass., announce that they are offering to manufacturers a new light model loom, shown in the illustration, and equipped with the Northrop attachment. The loom has been on the market for several months and orders for it have already been filled. The object of this loom is to fill the demand for a strictly two-harness loom for light goods.

The builders state that light goods demand freedom from thick and thin places. Automatic looms require special attention in this

direction, although the common loom is sufficiently sinning in this respect. They have perfected a system of double forks and take-up that seems to absolutely prevent faults of this nature. The take-up does not let-back to avoid thin places—in fact, the letting-back idea is never positive, as it depends upon the tension of the warp and the free turning of the bearings of the take-up. The take-up is prevented from working if filling is not laid, and prompt detection is ensured by the use of two forks.

Another new feature is the new take-up itself which is of simple design. It is operated by a cam on the lower loom shaft and so timed that it will not take up unless the shuttle is picked. Ordinary take-ups will act if the lay is moved by hand without filling being laid. The ratchet shaft operates through a worm to the take-up roll—no chance for back lash of gears.

The let-off is the latest improved Draper-Roper, now their standard. It regulates from the size of the warp beam and requires no adjustment from full to empty beam. The builders state that it weaves with a more uniform tension than any other let-off they have ever introduced. A new attachment to this loom is called the "anti-bang." The frog slide connects to the whip roll so as to release the warp in case the loom bangs off. This is said to relieve the loom itself from shock and also to prevent smashes.

IMPROVEMENT IN DRYING CYLINDERS.

For a long time it has been the desire of builders of drying cylinders for drying cloth and paper to have the internal arrangement of the cylinders so constructed that there shall be an absolute discharge of all water condensed in the cylinders, regardless of what steam pressure is carried, or at what speed the cylinders revolve, the discharge shall be constant and all of the cylinders in a machine be at all times free from water. By constantly keeping this idea in view, the Textile-Finishing Machinery Company, Providence, R. I., announce that they have made their idea a fact, and are now building their cylinders with the interior constructed in such a manner that when they are turning, all water is discharged from them as fast as it is condensed inside of them. They have gone farther and have perfected a device that draws the air from the cylinders and with it the water from the pipes on the discharge side of the machine; it then discharges the air to the atmosphere without any loss of water, and forces the water at a high temperature into the boiler, and only using one pump to accomplish the whole.

By keeping the cylinders free from water and air there is a marked gain in speed of drying, in a superior condition and feel of the finished cloth; the colors are brought out better, there is a lowering of the steam pressure, and the saving in the consumption of steam is a feature that cannot be overlooked.

The results obtained by this combination appeal to the manufacturers at once and it does not need a second consideration. It is stated that it costs no more for help to run a machine that will dry 150 yards of cloth per minute than it does to run one that will only dry from 50 to 75 yards.

Now that the fact is established that the cylinders can be kept free from water and air, it only remains to have the proper amount of heating surface, i. e., in the cylinders, to obtain any amount of production desired. The diameter of the cylinders of a machine can be such as suit the idea of the purchaser, as it is stated that the water is removed from cylinders of large diameter even faster than from those of small diameter. Cylinders 23 in. diameter can be run and kept from water at a surface speed of 450 feet per minute and those of 48 in. diameter at 700 feet per minute; the advantage in speed is with cylinders of large diameter.

The application of the device for clearing pipes of water and air can be made to machines having cylinders fitted with old style scoops or syphons with marked advantage. By applying the device to the returns from heating systems, whether coils or radiators, they are kept free from water and air, a uniform temperature is maintained, steam pressure is reduced and fuel saved, there are no air valves or air cocks, no separate air pipes, no radical or expensive changes in the piping to be made, and nothing to be added that will get clogged and out of order.

SPEED CHANGING POWER TRANSMISSION.

The accompanying cuts are illustrations of a speed changing transmission which has sprung into prominence in the United States and Europe, and is built by the Speed Changing Pulley Company, Indianapolis, Ind. The advantage claimed for the speed changing transmission, which is shown herewith, is that it covers the entire field where a change of speed is required, and is not confined to any

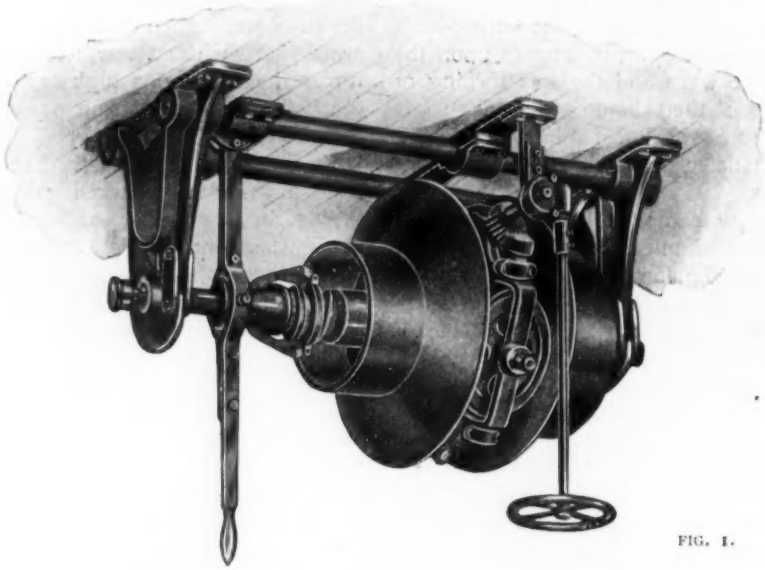


FIG. 1.

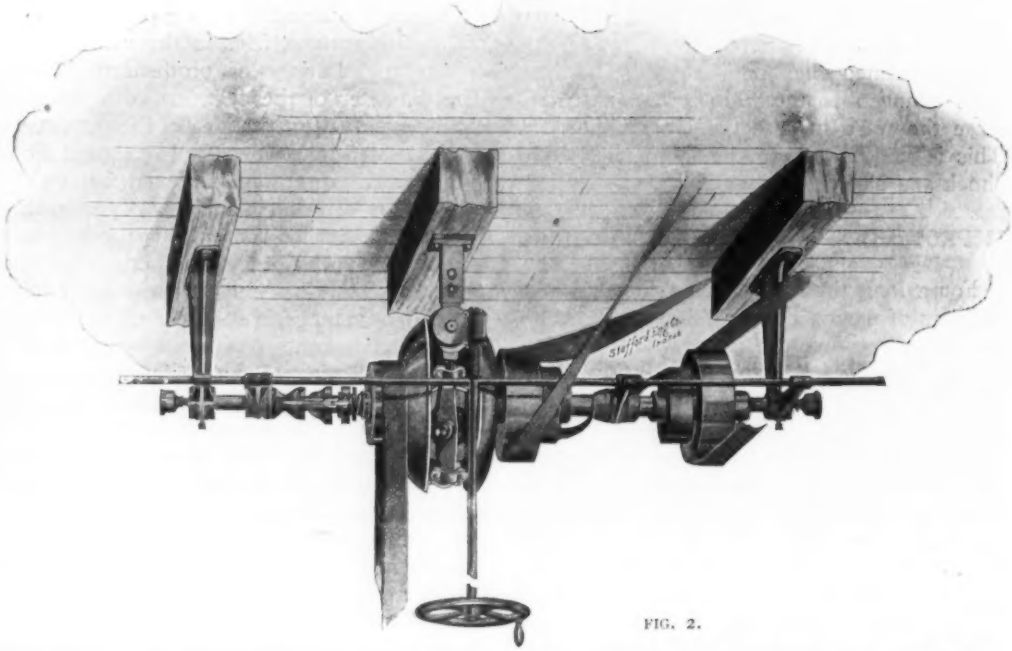


FIG. 2.

particular limits. It is made in all sizes ranging from 1/4 h. p. to 50 h. p., and can be incorporated into any machine or used as a countershaft or floor stand, or placed on a shaft of a governor in place of the ordinary pulley for changing the number of revolutions of the engine, while the same is in operation.

Fig. 1 illustrates a type of countershaft that

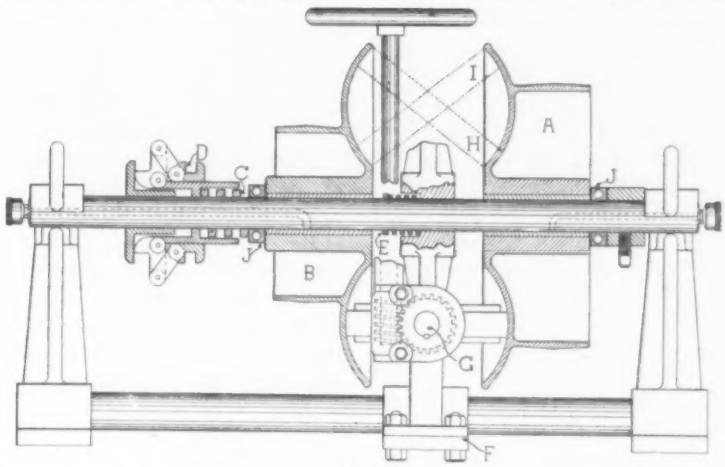


FIG. 3.

Important improvements have been added to this device within the past year. The manufacturers lay special stress on the manner in which the transmission is constructed. It is has been designed with great care, so as to be amply strong, yet neat in appearance, and take up as little room as possible. It has a high efficiency and great range of speed. Any

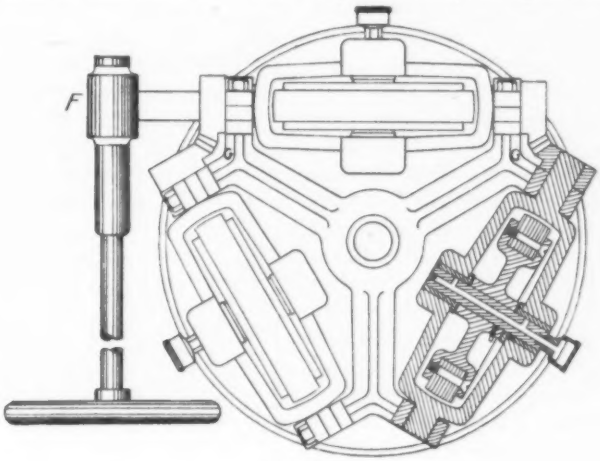


FIG. 4.

of the very best grade of material and workmanship, and is guaranteed for long service. It is substantial in construction, beautiful in design and noiseless in operation. There is speed within its range can be instantly obtained by turning the hand wheel "F" while in motion, it not being necessary to stop the machine or the work when changing the

speed. The shaft does not revolve, but is held stationary by set screws in hangers. Disk "A" with belt attached is the constant disk, and is driven by belt from line shaft or other source of power. Disk "A" transmits the power through three transmitter wheels to disk "B", which in turn transmits the power to the machine that is to be operated.

It will be noticed that no tight or loose pulley is used with this counter, but a clutch to compress or release the spring. Therefore, assuming that disk "A" is constantly running, if spring is compressed disk "B" will revolve, if spring is released disk "B" will become a loose pulley and stand perfectly still. All bearings are lubricated by means of grease cups through hollow shafts which insures perfect results, economy and cleanliness. This style of transmission is suited for all classes of machinery where but one motion (no reverse) is required to drive them.

Fig. 2 shows a type of countershaft designed to suit machines that require a backing belt, so that the machine can be reversed. The shaft in this, as in the foregoing cuts, does not revolve. To disk "A" is attached a long sleeve which revolves on the shaft; on this sleeve two clutch pulleys are arranged so that either one or the other can be made to drive the sleeve (consequently the disk) by means of the clutch, operated by the shifter. This shifter, at the same time, operates the clutch "C" so that when one of the belt pulleys is engaged the spring is compressed also, and disk "B" will revolve. When both belts are disengaged, the spring is released also, and disk "B" becomes a loose pulley which can be easily revolved by hand, which is very important when chucking work in a lathe, since it is easier to revolve the lathe with only one disk attached by belt than if the entire counter had to be revolved. The shaft in this case is hollow also, and the grease is forced through same by grease cups at the ends.

Fig. 3 is a sectional view of countershaft. The disk marked A is the constant disk which is driven from line shaft or other source of power. This disk revolves loose upon the shaft, and drives the three transmitter wheels. The three transmitter wheels drive disk B.

Disk B is held in contact with disk A by means of spring C; the tension of this spring can be increased or decreased at will, with a screw collar. The thrust is taken by two Auburn ball bearings at I. The toggle clutch D serves to compress or release the spring C, so as to make disk B a tight or loose pulley. The connection at F is made tight enough so it will not rock, yet loose enough so it will slide laterally to allow the spider to adjust itself for wear. The spring E serves the purpose of holding the transmitters in contact with disk A, so they will always be in motion when disk A is revolving.

The dotted lines in shaft will show how the grease is fed to the bearings. The bearings are fitted with bronze bushes which are easily replaced. It will be noticed that a worm wheel is keyed on one of the yoke shafts which meshes into a worm. This worm is connected to the hand wheel stem whereby the speed is changed. The transmitters can be shifted to any position in the concave disks. If shifted from extreme H to other extreme I, a range of 1 to 7 is obtained.

Fig. 4 shows how the three transmitters are placed. The worm is fastened on yoke shaft at F. This yoke is connected to the other yokes by two pair of bevel gears at G, G; if one yoke is shifted all three must shift.

It will be noticed that the transmitter shafts are fastened in the wheel and revolve with the same. They are hollow and grease is fed through them to the bearings; the bearings are fitted with bronze bushes.

The transmitter wheels are faced with a leather fibre, this when worn can be replaced at small expense.

Slasher. J. Krueckels, Zell i. W. Baden, Germany. A slasher on which the yarn is dried by a circulation of hot air, produced by fans inside the open reels or drums over which the yarn passes. Among the claims for this machine are economy of steam, uniform and quick drying, and increased softness and elasticity of the yarn.

Drying Machine. Tomlinson-Haas, Exchange Buildings, Manchester, Eng., are placing on the market an improved dryer for yarn, cloth and raw stock. It is designed to economize space and steam.

Dyeing, Bleaching, Printing, Etc.

TOPPING OF DIRECT COLORS.

Several years ago it was the practice of many dyers to resort to the expedient of "topping" direct colors with basic colors, and the custom extended to some extent to the shading of sulphur colors.

However much brighter the dyeing appeared after having been "topped," it has always been a question whether the time taken and extra handling was warranted by the results.

As a matter of fact, it is a mistaken idea to suppose that the direct colors as usually dyed upon cotton have any specially marked mordanting qualities, or that they can "lift" from the dyebath any marked quantity of basic color and fix it so that it will not rub off or smut. How many times have dyers tried to brighten the direct blues by topping with methylene blue, and yet it has been shown by careful laboratory experiments that the fixation of this blue is not possible when used as above suggested.

All the basic colors require that they be converted into insoluble compounds upon the fibre, and when substances are not present capable of making such insoluble compounds, the topping is not accomplished.

A direct dye has not the power of taking up a basic color or fixing it on the fibre, a statement that is readily proved by taking a skein of a cotton dyed with a direct blue, and working it in a bath containing a small quantity of a basic blue or a violet, along with a similar though undyed skein, and noting the result. It will be seen that the undyed skein will be stained to some extent, and in the same proportion as the blue dyed skein, and no dyer will assume that the topping has any permanent value.

Of course, for certain kinds of work, perhaps, "topping" with basic colors will answer, but it is a process not to be recommended for its good qualities.

INDOCHROMOGEN S.

For the printing of cotton fabrics this product plays a very important part, as it unites a number of essential features, chief of which are ease of application, fastness to light, washing, etc., does not smut or rub off in the slightest degree, and yields shades that very closely approximate indigo, especially when applied in light percentages.

Indochromogen, unlike many other similar blues, is quite readily discharged, and thus the printer is able to make use of it in the production of quite a number of designs and effects.

Soluble in warm water, it is readily made into a uniform paste, absolutely free from any insoluble particles, which otherwise would show to a disadvantage on the finished prints.

It may be applied to cotton cloth that has been either prepared with oil or otherwise. The following formula have all been worked out on a large scale, and may be used as typical for this very interesting product.

Process I—For Unoiled Cloth: Prepare the printing paste in the following manner. Dissolve Indochromogen S, 30 parts, in warm water (160° F.), 250 parts. Stir until the solution is complete, and allow to become cold, and add neutral wheat starch paste, 650 parts, chromium acetate (32° Tw.), 40 parts, calcium acetate (25° Tw.), 30 parts. Mix thoroughly, print in the usual manner, dry, and steam.

Process II—For Oiled Cloth: The cloth is prepared with Turkey red oil in the usual manner, the oil padding liquor containing for each gallon about 3 ozs. of caustic soda lye, or sufficient to impart a decided alkalinity to litmus paper. The printing paste is prepared with Indochromogen S, 30 parts, warm water (160° F.), 280 parts. Stir until solution is complete, and when cold, add neutral wheat starch paste, 650 parts, chromium acetate (32° Tw.) 40 parts. Print and steam for half an hour without pressure, and then run through a bath containing chalk, then through

a wash water, and afterwards finish by giving a thorough soap.

If the steamer is adapted for pressure work it may be used up to, say, 7 lbs., but shortening the time of goods in the apparatus.

FOR PADDING AND DISCHARGING.

As Indochromogen in readily discharged it lends itself admirably to the production of very handsome effects by this process. The color is best applied in a jigger, the padding liquor being prepared thus:

30 parts Indochromogen S.
20 parts Acetic Acid.
744 parts Water.
200 parts Tragacanth Paste (65:1000) reduced one-third.
70 parts Chromium Acetate (32° Tw.).
48 parts Calcium Acetate (25° Tw.).

Give a number of runs sufficient for the depth of shade desired and dry in a chamber or hot flue or, preferably, over heated cans, and steam without pressure for half an hour; finally wash and dry.

This treatment prepares the fabric in the best possible manner for receiving the discharge.

WHITE DISCHARGE PASTE.

I.

Wheat Starch Paste (1:5) ..... 3 qts.
Chenate of Potassium ..... 2 lbs.
Yellow Prussiate of Potash ..... ¼ lb.
Water ..... 1 pt.

II.

Canary Dextrine Paste (1:2) ..... 3 qts.
Citric Acid ..... 3½ lbs.

Mix together the two solutions, stir well, and print on an ordinary cylinder machine. Steam for about five minutes, wash well, and give a passage through a soap bath heated to about 100° F., for about ten minutes in order to bring out the full brilliancy of the white pattern.

Chromium acetate, as suggested above, may be very easily prepared by the color mixer, and as it appears to yield the very best results when not very old, it is perhaps better to prepare it as immediate demands require.

Dissolve:

Chrome Alum ..... 36½ lbs.
Water ..... 15 lbs.

and in a separate tub:

Sugar of Lead ..... 36½ lbs.
Water ..... 15 lbs.

These two solutions are best made with hot water. Mix them, stir well, and allow to stand for 12 hours, when the clear liquor is drawn off for use. The white residue, consisting of sulphate of lead, is of no value and may be thrown away.

The solution of acetate of chromium as made above will contain from 4 1/4 to 4 1/2 per cent. of oxide of chromium.

Indochromogen S is to be regarded as a very useful color to be used in connection with other alizarine bisulphite bodies in the production of compound shades, and as a self color on account of its usefulness for producing delicate, bright, fast blue outlines.

BLEACHING AND WHITE DYEING OF WOOL.

If raw stock is to be treated, it should be selected as free as possible from all artificial stains and colored tips. As for piece goods or yarns, the material should be well scoured and rinsed.

For 100 lbs. of material the bath should have a volume of about 200 to 250 gallons, and charged with about 2 gallons of a solution of bisulphite of soda standing at 76° Tw., together with 1 1/4 lbs. sulphuric acid. Enter the material and work well for 30 to 45 minutes, lift, allow to drain, and proceed to the white dyeing without intermediate washing. The exhausted bisulphite bath is run to waste.

The dyebath is prepared with a similar volume of water, which must be almost chemically free from iron if clear results are desired. Heat to about 100° F., and add a small quantity of either Alkali Violet or Soluble Blue, if a blue or greenish-blue tone is wanted. The dyestuff should be previously dissolved in hot water and cautiously added to the dyebath through a fine cloth sieve as a precaution against minute specks.

Washing after dyeing is desirable if clean and pure water is at hand, when such is not

the case it may be admissible to proceed very slowly with the drying at as low a temperature as possible.

Impure water is the enemy of good bleaching, and in mills where purifying plants are not installed, the dyer is frequently at a disadvantage. It may not be widely known that an impure water containing iron may be rendered available for bleaching by boiling it up with bran, then skim off, and cool to the working temperature.

HYDROSULPHITE AS A REAGENT FOR STRIPPING COLORED SHODDY.

Of all practically available substances for the purpose of removing the color from shoddy, hydrosulphite is the most satisfactory on account of it being least likely to injure the material treated, although it is most effective for the purpose intended at a boiling temperature. The feel and elasticity of the fibres are in no way injured, while the stripping is most effectively done.

The stripping is done in the following manner:

Boil about 100 lbs. of rags in a vat containing from 200 to 250 gallons of water, and from 100 to 150 lbs. of hydrosulphite solution, according to the fullness of the color on the rags. Turn from time to time so that every part becomes equally acted upon, and in about one-half to three-fourths hour the operation will be complete. Lift, allow to drain and wash well; they are then dried and treated according to the nature of the work in hand.

The hydrosulphite solution is prepared in the following manner:

Dilute two gallons of sodium bisulphite (Sp. Gr. 1.35) into 22 gallons of water heated to 100° F., and then adding slowly but with constant stirring 4 lbs. zinc dust of the best quality—must be fresh to secure the best results. After the gas bubbles have ceased being evolved the reaction is over, and all that is necessary is to allow the liquid to stand at rest, let the insoluble matter settle, and draw off the clear portion for use.

Various modifications of the above process are suggested but all others are somewhat more costly as the price of the raw material is higher, and nothing is gained in results.

If the stripping is to be done in closed vessels, less hydrosulphite will be required.

BLEACHING OF RAW FLAX FIBRES.

All the various bleaching processes applied to the several fibres of which flax is a type, may be regarded as based upon the cotton bleaching process as carried out with bleaching powder. In regard to flax, however, a slight modification of the process is introduced in the form of motion being given to the fibres while actually in the bleach bath.

In the first place, before any bleaching can be done it is necessary to subject the fibre stock to the action of boiling soda or lime, to remove as much as possible the various impurities always present, and then proceed with the chlorine liquors.

The one important point to observe in flax bleaching is the ready action that the bleach liquors have upon the fibres, and unless care is taken to have these sufficiently weak, the batch will be "burned" and rendered unfit for further use. The natural coloring matter of flax is very peculiar in that it is not actually destroyed by the bleach liquors, but is made quite soluble, and in this condition is readily removed by an alkaline wash. One application of the bleach liquor will not yield the result desired; it is necessary to repeat the bleaching liquor treatment several times, alternating with the alkaline wash.

The bleaching of linen fabrics is a special branch of textile work, requiring long experience and special local conditions which are essential for the very best results.

Closely related to flax bleaching is the bleaching of jute, but up to the present no entirely successful method has been devised that will yield a perfect bleach and at the same time leave the fibres with their original strength. Bleaching powder is not available for this fibre, and in consequence the sulphites, bisulphites, permanganates, etc., must be used.

Unlike flax, jute will not stand much alkaline treatment, so that mild alkaline salts must be employed, for instance—borax.

Hemp may be bleached with bleaching powder, but its natural color resists a number

of successive treatments so that it is not a profitable undertaking.

The entire problem of bleaching these fibres is one of great technical importance, for if commercially practical processes could be obtained it would mean a marked extension of the fields of usfulness now occupied by these fibres. Any process devised must so do its work as not to impair the strength of the fibre substance.

TESTING OF WATER FOR DYEHOUSES, ETC.

The usual methods for the technical testing of water do not meet the requirements of the dyer or bleacher, and for this reason the results as usually reported to textile manufacturers by chemists do not carry the degree of conviction that is expected.

Besides the customary analysis that is made it will be found advisable for the manufacturer to insist upon the analysis to be accompanied by laboratory tests made upon the general grade of goods that it is intended to make.

The dyeings best adapted are of very light shades, and may be made with direct colors—a pure blue, pink and a yellow—one set into distilled water and the other into the water it is intended to use.

Another set of tests is made with chemically pure chemicals and distilled water on one hand and with the water in question on the other. This test is to be made with tannic acid and tartar emetic (not antimony salt). Bleached material should be used.

These tests will show beyond doubt, if the water to be used contains injurious substances, how they will affect the general run of work. Of course, water containing mechanically suspended impurities, such as clay or silt, should not be used, unless special clarifying apparatus are installed.

The average manufacturer requires reports that show the results he may expect in practice, and not figures with the nature of which he is not familiar.

The finest commercial hemp is produced in Italy. The fibre is soft, creamy, very strong and often over eight feet in length.

CALENDER LUSTERING.

From time to time we have described the process of imparting a silk-like lustre to cotton goods by passing the pieces through finely grooved calender rolls. This process, originated, we believe, in Germany and recently a patent for an improvement on it has been obtained by J. Eck, Dusseldorf. In a description of the Eck process it is stated that the gloss produced on the fabric by rollers with parallel grooves, for example, with only 15 diagonal grooves per millimetre possesses scarcely any silk-like character, which is to be ascribed to the fact that the effect of these rollers is more like that of smooth surfaced rollers. By the use of the new process 40 and more grooves per millimetre can be produced on the fabric and a silk-like gloss obtained by pressing the fabric first with a roller which contains ten perpendicular and ten parallel grooves per millimetre and then with a second roller with 10 diagonal and 10 oppositely diagonal grooves per millimetre.

Fig. 1 shows a side view of the pressing roller. The surface of this is engraved with fine grooves, crossing each other. These grooves may have any desired pitch, direction and slope. In Figs. 2 to 5 parts of the roller surface are shown largely magnified. Fig. 2 shows the crossing of perpindicular grooves b b with diagonal grooves c c. The adjoining sides of consecutive grooves are sloped equally, and thus pyramids are produced on the surface of the roller. The shape of the pyramids may be seen from the sections A—B and C D. Fig. 3 shows the crossing of parallel grooves d d with perpendicular grooves e e. The sides or faces of both sets of grooves are sloped equally, so as to produce small upright pyramids with square bases. The shape of the pyramids may be seen from the section E—F. Fig. 4 shows the crossing of parallel grooves f f with diagonal grooves g g. The former are equally, the latter unequally sloped. Thereby small slanting pyramids are produced, the shape of which may be seen from the section G—H. Fig. 5 shows the crossing of diagonal grooves h h with oppositely diagonal grooves i i.

Both grooves are unequally sloped. This again produces small pyramids, but the apex of each is not situated perpendicularly over the centre of its base, as will be seen from the section J—K.

As two, three and more grooves and ridges of different directions may cross each other on the surface of the rollers, and as the grooves themselves may form straight or curved lines, multifarious designs can in this way be produced on the surface of the roller so as to correspond with different kinds of fabrics. A high, silk-like gloss is produced by the crossing of very fine grooves which has unequally sloped sides or faces, as indicated by Figs. 4 and 5. The silk-like gloss produced by the new pressing rollers differs from that produced by the finely grooved rollers usually employed for this purpose by its easy visibility from all sides, because the light rays which fall on the fabric are equally reflected on all sides.

As the many little figures produced by the crossing of the fine grooves scarcely possess the size of a dot, regular geometric figures are, of course, out of the question. The small figures will in reality be formed partly by the crossing of plane and curved surfaces, partly by plane and curved surfaces merging one into the other, or only by curved surfaces. The latter will be specially numerous or even exclusively produced if the fine grooves crossing each other are drawn in curves.

As a modification, a pattern plate or dye plate may be covered with fine ridges crossing each other, as shown in example of Figs. 2 to 5, and the surface of the roller treated with the plate, in which case the roller surface will have indentations, the negatives of the former figures. These negative forms may, however, be directly engraved on the surface of the roller, without the use of a pattern plate. While, therefore, in the Figs. 2 to 5 the groove recesses are crossing each other and the groove elevations or ridges are divided into small particles, the opposite is the case, when the roller surface is treated by the method just described. The groove ridges are crossing each other and the groove recesses are divided into minute recesses of the size of dots.

THE DIRECT PRINTING OF INDIGO.

The general principle of indigo printing upon textiles is based upon the well known property of the indigotine of the indigo to be made completely soluble by means of reducing agents, in essentially the same manner as for dyeing, it having been observed that when such a reduced solution of indigo was applied to a woven fabric and exposed to the atmosphere, the blue color was developed and remained permanently upon the spot where the solution was placed. This fact was first made use of in the early part of the 18th century, when the earliest recorded attempts to print designs upon cloth were made.

The oldest process of which we have any exact knowledge was naturally very crude, and hardly more than a thickened solution of indigo previously dissolved in a mixture of arsenic sulphide and caustic potash, which is known as the "orpiment vat," orpiment being the name of the native sulphide of arsenic.

The earliest attempts to use indigo thus reduced for the production of patterns were not exactly those of printing, but rather a painting with brushes, after which the color was developed to its maximum by exposing to the air and washing in water.

The so-called lime and copperas vat, sometimes called the "vitriol vat," was used in a modified form in England at the end of the 18th century for the production of what was known as "Faience Blue." This was actually a printing process, being essentially the first process for printing a reduced and thickened indigo upon tissues by means of blocks.

Another process for printing solid blues upon calico, using indigo reduced by means of stannous hydrate, a caustic alkali, and sugar, was used to a considerable extent in Great Britain, and carried to the Continent, about 1825 or 1826, where it reached a very high degree of perfection. This was really the first practically successful indigo printing process.

The well known Schutzenberger and Lalande process, the hydrosulphite vat, has also been much used for textile printing, as is also the method of Prudhomme, also known as the alkali-glycerine process, which is used in connection with steam to aid in developing by

oxidation to the maximum, the latent indigo white.

These several processes have all been worked at various times, but none of them have ever succeeded in gaining for themselves a permanent position in the textile printing art, and are to be regarded rather in the light of stepping stones to other processes of greater utility.

About 1880, Schlieper and Baum worked out a process, known technically as the "Glucose" process, the chief feature of which is that the indigo is reduced by means of caustic alkali and grape sugar. It may be regarded as one of the most successful processes devised, and as such is made much use of at the present time.

A process for isolating indigotine was devised by Fritzoche about 1840, the reaction depending upon the action of a combined solution of alcohol, grape sugar and caustic alkali. This process remained simply a laboratory process for indigotine, and it was so used until 1863, when Leese evolved from it a process for textile printing of some practical value.

The details of this process are as follows:

The ground indigo and the reducing agents are brought upon the fabric to be printed in the form of a paste, which is compounded by stirring the thickening material, such as dextrine or British gum, with cold water. Then add the caustic soda, warm for about twenty minutes from 140° to 175° F., and cool, after which add the proper amount of indigo pure 20 per cent. Practice has pointed out that it is best to allow the thickened paste to stand for several days, thus assuring a more finely divided state of the indigo, probably due to the action of the caustic.

After printing, the cloth is dried at a temperature not much above 85° F., but the result largely depends upon the steaming which is carried out in an atmosphere as free from atmospheric oxygen as possible, this being done by displacing the air by means of special steam jets. Steaming continues for a short time only, 30 to 40 seconds being sufficient; longer steaming is somewhat injurious.

Upon removing from the steam-box the prints should have a characteristic yellowish-brown color—any tendency to green indicating that the reduction is not complete.

When reduction is properly done, the color exists on the fibres as indigo white. It is developed by simply passing through water, the dissolved oxygen of which fixes and develops the color.

The following formula may be of interest as showing how the process would be done:

I. GLUCOSE PREPARATION.

Pad the cloth with a solution of
100 to 200 parts Glucose, in
1000 parts Water,
and dry at from 100° to 110° F.

II. PRINTING PASTE.

A—Thickening R J.

320 parts Dextrine or British Gum.
340 parts Water.
1000 parts Caustic Soda Solution (90° Tw.)

heat for 20 minutes to 140° to 175° F., and sieve for use.

B—Thickening C J.

This is an alkaline gum thickening, and is recommended for light shades.

40 parts Caustic Soda Solution, 90° Tw., pound slowly into
50 parts Gum Senegal Solution (1:1).

PRINTING PASTE.

Mix indigo pure 20% with the following proportions of thickening R J.

For Dark Blue:
190 Thickening R. J.
25 Indigo Pure (20% paste).

For Medium Blue:
225 Thickening R J.
10 Indigo Pure (20% paste).
25 Water.

For Light Blue:
225 Thickening R J.
5 Indigo Pure (20% paste).
12 Water.

Print, and afterwards dry at the ordinary temperature.

For a very dark blue, use
80 Dextrine.
125 Water.
205 Caustic Soda Solution 90° Tw.

Owing to the chemical action the temperature rises of its own accord, when 55 parts Indigo Pure (20% paste) are gradually stirred in, and afterwards sieved.

STEAMING AND WASHING.

This is done as previously described, the main point being to make it as thorough as possible within the short time that is required. After washing to oxidize the indigo white into indigotine, the fabrics can very well be given a good soaping.

THE SCOURING OF WOOL WITH SOLVENTS.

There can be no doubt remaining in the mind of any person more or less familiar with animal fibres, that wool of either medium or high grades, when scoured by the usual process with soap and soda, or potash solutions, is less desirable in feel, etc., than the same grade of wool when cleansed by means of some volatile solvent.

It is remarkable that with all the inducements offered to woolen manufacturers and others, in the shape of higher prices, etc., that they do not adopt some scheme whereby they might be able to avail themselves of this condition, by making use of some one of the modern processes for treating and handling the wool in a scientific manner.

The choice of process to adopt for this purpose is not difficult when we consider that any hydrocarbon solvent will meet the requirement, but experiments covering a long time and conducted upon a large scale, have demonstrated that ordinary gasolene will meet every requirement and leave the stock in the most desirable condition.

Of course, to conduct this business on a paying scale outside of the mills, it will be necessary for wool growers or dealers or others largely interested in the raw wool business, to unite and form an association the object of which would be to erect properly equipped "scouring stations and depots" so that the work could be centralized as much as possible. The machines and all parts of the plant should be of the most modern construction and as nearly automatic as possible.

Briefly, the operation of such a plant would be to degrease the dry wool by means of petroleum gasolene, operating by circulating through the entire wool mass, until it has dissolved from the stock all the soluble grease. Then an inert gas would be forced in to displace the gasolene, after which the wool would be given a passage through warm water contained in woolwashing machines of the ordinary type.

This sequence of events would be repeated without variation on all kinds of wool, as all would be treated exactly alike—a feature quite different from ordinary wool scouring where the scour liquors have to be modified for almost every other batch of wool.

The plant would have to be supplied with a distilling plant for the recovery of the gasolene, and the saving of the grease which, after special though simple treatment, becomes at once a most valuable article of commerce.

The warm water scourings in the machines also contain the soluble potash bodies of the wool and are easily converted into a pure type of potash.

This general process of wool scouring, as is seen, is operated upon the principle of taking greases, etc., away from the wool, and is essentially the reverse of the common process. The complaint is occasionally heard that the solvent process leaves the stock harsh and brittle, but such is not the case. The chances of injury to the wool by this treatment are *nil*, while, on the other hand, when scouring with alkaline liquors there always exists a hidden danger in the alkalies present.

The reason why the solvent process has not made greater headway is due to two causes: one, its cost as applied to mills of average size, and it is to be doubted whether an economical plant of reasonable cost could be installed in the largest mills. On the other hand, there has always been a fear of fire, which when working with inflammable fluids in large quantities becomes quite dangerous, but with the modern safeguards such fears can be reduced to a minimum.

Canton flannel received its name from Canton, China, from which city it was first imported into England.

New Color Cards.

Benzo Fast Scarlet; Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.

A collection of samples showing various shades dyed with Benzo Fast Scarlet 5 B S and 8 B S on various fabrics, including mercerized and unmercerized cotton yarn and cloth, half silk and half wool fabrics.

Benzo Fast Red G L; Farbenfabriken of Elberfeld Co., 40 Stone St., New York City.

This card shows samples of cotton yarn, mercerized and unmercerized sateen, and half wool piece goods dyed with Benzo Fast Red G L.

Triazol Brown GOO; Geisenheimer & Co., 189 Front St., New York City.

This card shows three samples of cotton yarn dyed with different percentages of Triazol Brown GOO.

Triazol Blue B; Geisenheimer & Co., 189 Front St., New York City.

Three samples of cotton yarn dyed different shades of blue with Triazol Blue B.

Titan Como B and 2 B; Read, Holliday & Sons, Ltd., 7 Platt St., New York City.

Four samples of cotton yarn and two of cotton piece goods dyed bright blue with Titan Como B and 2 B.

Metachrome Yellow D, R D and 2 R D; Berlin Aniline Works, 213 Water St., New York City.

This card shows three samples of woolen yarn and three of loose wool dyed different shades of yellow with Metachrome Yellow D, R D and 2 R D. Full dyeing directions are given.

Diaminogene Blue N A; Cassella Color Co., 182 Front St., New York City.

Four samples of cotton yarn, two of raw cotton and two of cotton cloth, dyed with Diaminogene Blue N A.

Diamine Fast Blue F F G and F F B; Cassella Color Co., 182 Front St., New York City.

A collection of samples showing various shades of cotton yarn, cloth and raw cotton both dyed and printed with Diamine Fast Blue F F G and F F B.

Pennsylvania, Clifton Heights. In several of the textile papers a statement has been made to the effect that the Columbus Knitting Mills, of which Messrs. Crawford & Quinn are the proprietors, had been shut down for three weeks on account of the prohibitive price of raw material. Mr. Quinn wishes it announced to the trade that this is untrue. They shut down for one week only to enable them to make repairs to their machinery, etc., and to complete a new dyehouse, which is now in full operation. The company is full with orders and are working until nine and ten o'clock at night in an effort to get them out. The production of this plant is laces, full fashioned and circular goods, which they produce on 50 ribbers, 50 knitters and 12 loopers and seamers, welters, etc., and 1 set full fashioned machines.

DYE RECIPES.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD RECORD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16-page pamphlet, in convenient form for preservation. Subscription price for the Dyers' Supplement $1.00 per year.

Recipe No. 145.

Blue on Worsted Yarn.

Fast Acid Blue A on 100 lbs. worsted yarn. Prepare the dye bath with

2 lbs. Fast Acid Blue A.
(E. M. Thayer & Co., 106-112 Broad St., Boston.)
15 lbs. Glauber's Salt.
3 lbs. Sulphuric Acid.

Enter yarn at 140° F., bring to a boil and finish dyeing within one hour.

Fast Acid Blue A is a very level dyeing product, can be used as a mordant color, and is particularly valuable for combination with alizarine blues or logwood for brightening purposes.

Recipe No. 146.

Blue on Worsted Yarn.

Anthracene Chrome Blue R on 100 lbs. worsted yarn. Prepare the dye bath with

2½ lbs. Anthracene Chrome Blue R.
(Cassella Color Co., 182 Front St., N. Y.)

Dissolve in about ¼ its weight of Acetic Acid and hot water

10 lbs. Glauber's Salt.
5 lbs. Sulphuric Acid.

Enter at 180° F. and bring to boil. Add only 2 lbs. of acid at start and add remainder toward end to exhaust. When thoroughly exhausted after-treat for 1 to 1½ hours at a boil with

2 lbs. Potassium Bichromate.

Anthracene Chrome Blue R gives shade of blue excellently fast to light, carbonizing, milling, stoving and steaming.

Recipe No. 147.

Blue on Cotton Yarn.

Triazol Blue B on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Triazol Blue B.
(Geisenheimer & Co., 189 Front St., N. Y.)

20 lbs. Glauber's Salt.
1 lb. Soda Ash.

Enter at 170° F., bring to a boil and dye at a boiling temperature for one hour.

Triazol Blue B dissolves easily, produces level shades and possesses very good fastness.

Recipe No. 148.

Black on Cotton and Wool Union Goods.

Bengal Deep Black B Extra on 100 lbs. union goods. Prepare the dye bath with

5 lbs. Bengal Deep Black B Extra.
(Sykes & Street, 85 Water St., N. Y.)
25 lbs. Common Salt.

Enter at 170° F., bring to a boil, dye at a boil for one half hour, and for one half hour longer in a gradually cooling bath.

Bengal Deep Black B Extra will produce an excellent shade of black on union goods with a comparatively low percentage of dye stuff.

Recipe No. 149.

Blue on Cotton Yarn.

Thiogene Blue B on 100 lbs. cotton yarn. Prepare the dye bath with

15 lbs. Thiogene Blue B.
(Herman A. Metz & Co., 122 Hudson St., New York.)
22½ lbs. Sodium Sulphide
6 lbs. Soda Ash.
20 lbs. Na_2SO_4.
1 pint Caustic Soda, 125° Tw.

Thiogene Blue B is dissolved in 1 1/2 to 2 times it s own weight in sodium sulphide crystals and boiling water. The solution is added to the bath which contains soda ash and caustic soda and which has been previously boiled up. If the shade remains brownish more sodium sulphide is added. The material is dyed for one hour at 160° to 190° F., then squeezed, wrung evenly, or hydro extracted. and the shades developed by hanging the goods 1 to 2 hours in open air, or by steaming 1/2 to 3/4 hours with air. Rinse well and after-treat for 1/2 hour at 140° F., with

4 lbs. Copper Sulphate.
3 lbs. Acetic Acid.

Thiogene Blue B possesses excellent solubility, and is excellently fast to light, acid, washing and milling.

Recipe No. 150.

Violet on Worsted Yarn.

Acid Violet V on 100 lbs. of worsted yarn. Prepare the dye bath with

1 lb. Acid Violet V.
(E. M. Thayer & Co., 106-112 Broad St., Boston.)
10 lbs. Glauber's Salt.
1½ lbs. Sulphuric Acid.

Enter yarn at 120° F., bring to a boil and dye at a boiling temperature for one hour.

Acid Violet V is very fast to light, and is well adapted for toning any of the acid reds.

Recipe No. 151.

Black on Cotton Yarn.

Katigen Black S W R on 100 lbs. cotton yarn. Prepare the dye bath with

12 lbs. Katigen Black S W R.
(Farbenfabriken of Elberfeld Co., 40 Stone St., N. Y.)
24 lbs. Sodium Sulphide Crystals.
30 lbs. Glauber's Salt.
2 lbs. Turkey Red Oil.

Enter yarn at 150° F. and dye just below boil for one hour, keeping the bath as short as possible.

Katigen Black S W R possesses excellent fastness to light, alkalies, acids and washing.

Recipe No. 152.

Orange on Cotton Yarn.

Tetrazo Orange B on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Tetrazo Orange B.
(New York & Boston Dyewood Co., 156 William St., N. Y.)
20 lbs. Common Salt.

Enter yarn at 170° F., bring to a boil and dye at a boiling temperature for one hour.

Tetrazo Orange B gives an excellent shade of orange, and possesses the characteristic properties of the direct cotton colors.

Recipe No. 153.

Yellow on Cotton Yarn.

Phenedine Fast Yellow C Y on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Phenedine Fast Yellow C Y.
(Sykes & Street, 85 Water St., N. Y.)
30 lbs. Common Salt.

Enter yarn at 170° F., bring to a boil and dye at a boiling temperature for one hour.

Phenedine Fast Yellow C Y gives an excellent shade of yellow, and possesses the characteristic properties of the direct cotton colors, and very good fastness.

Recipe No. 154.

Violet on Cotton Yarn.

Benzo Violet R L Extra on 100 lbs. cotton yarn. Prepare the dye bath with

4 lbs. Benzo Violet R L Extra.
(Farbenfabriken of Elberfeld Co., 40 Stone St., N. Y.)
40 lbs. Glauber's Salt.
2 lbs. Soda Ash.

Enter at 170° F., bring to a boil and dye at a boiling temperature for one hour.

Benzo Violet R L Extra has very high coloring power, and possesses very good fastness to light.

Recipe No. 155.

Black on Woolen Cloth.

Azo Merino Black B on 100 lbs. woolen cloth. Prepare the dye bath with

6 lbs. Azo Merino Black B.
(Cassella Color Co., 182 Front St., N. Y.)
15 lbs. Glauber's Salt.
5 lbs. Sulphuric Acid.

Enter goods hot, bring to a boil and boil until the color is exhausted.

Azo Merino Black B possesses valuable properties, the principal advantages over others being that they dye perfectly level in a strong acid bath and penetrate well, giving a full bloomy shade resembling very closely a logwood black. The color does not change with artificial light, and its fastness to light, alkali and crocking are all very good.

Recipe No. 156.

Yellow on Worsted Yarn.

Meta Chrome Yellow D on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Meta Chrome Yellow D.
(Berlin Aniline Works, 213-215 Water St., New York.)
6 lbs. Meta Chrome.
20 lbs. Glauber's Salt.

Enter yarn at 160° F., bring to a boil and boil until bath appears only slightly yellow, then boil one-half hour longer to completely fix the dyestuff.

If possible boil the yarn awhile with 2 lbs. of the meta chrome alone, and then add dye stuff and remaining 4 lbs. of meta chrome and finish.

Meta Chrome Yellow D gives an excellent shade of yellow on wool, which possesses very good fastness to the common color destroying agencies.

Recipe No. 157.

Blue on Cotton Yarn.

Titan Como 2 B on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Titan Como 2 B.
(Read, Holliday & Sons, Ltd., 7 Platt St., New York.)
2 lbs. Acetic Acid.

Add

30 lbs. Common Salt.

Enter at a boil and dye at a boil for one-half hour. The bath should be well exhausted.

Titan Como 2 B is a bright direct cotton blue, possesses good leveling powers, and stands light and washing very well.

Recipe No. 158.

Reddish Brown on Cotton Yarn.

Tetrazo Chlorine Brown R on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Tetrazo Chlorine Brown R.
(New York & Boston Dyewood Co., 156 William St., New York.)
30 lbs. Common Salt.

Enter yarn at 170° F., bring to a boil and dye at a boiling temperature for one hour.

Tetrazo Chlorine Brown R gives an excellent shade of brown and possesses properties characteristic of the direct cotton colors.

Recipe No. 159.

Blue on Cotton Yarn.

Pyrol Blue on 100 lbs. cotton yarn. Prepare the dye bath with

5 lbs. Pyrol Blue.
(C. Bischoff & Co., 88 Park Place, New York.)
20 lbs. Sodium Sulphide.
20 lbs. Glauber's Salt.

Enter yarn at 150° F., and dye at or just below the boil for one hour, keeping below the surface of the dye liquor as much as possible.

After-treat for one-half hour at 170° F. in a bath containing

1½ lbs. Potassium Dichromate.
1½ lbs. Copper Sulphate.

Wash and dry.

Pyrol Blue gives a very fast shade.

Recipe No. 160.

Blue on Cotton Yarn.

Dianol Blue 2 B on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Dianol Blue 2 B.
(Thos. Leyland & Co., 53 India St., Boston.)
20 lbs. Common Salt.

Enter yarn at 180° F. and dye at a boil for one hour.

Dianol Blue 2 B gives a bright full shade of blue, dissolves easily and dyes level.

Mill News.

COTTON.

New Mills.

*Alabama, Sylacauga. The new yarn mill to be erected by T. J. Mathews of the Marble City Hosiery Mills, will be equipped with 2,000 spindles. The machinery is being installed.

*Georgia, Cartersville. Work is progressing on erection of the buildings for the E. L. McClain Manufacturing Co. The main building is nearly ready for the roof, and as soon as possible the machinery will be placed.

*Georgia, Columbus. The Muscogee Mfg. Co. will install about 14,000 spindles in the new mill upon which work of construction has begun. They will make no increase to the looms.

*Massachusetts, Fall River. The Watuppa Mills, to manufacture fancy cotton and silk goods, are not yet in a position to give details concerning the plant. Wm. B. Edgar is treasurer of the concern.

*Massachusetts, Fall River. The Puritan Mills is name of the new concern recently incorporated for manufacturing absorbent cotton. This is the mill in which William J. Dunn was previously mentioned as interested. The plant is being established in the Billings-Clapp factory on Bay Street.

*Mississippi, Magnolia. The Mississippi Textile Novelty Co. is about to start up a small plant of 25 dobby looms, for making fancy shirtings, dress goods and novelties. Sam R. Stevens is secretary and treasurer of the concern.

*North Carolina, Bessemer City. The machinery is being installed in the Whetstone Mills and it is expected that plant will be ready to start operations during the month of October. Fine damasks will be made.

*North Carolina, Charlotte. The Fidelity Manufacturing Company has been incorporated with capital stock of $500,000, with E. N. Clemence of Columbus, Ga., as president and manager of the concern. Company has purchased the plant of the Ada Manufacturing Co. and will put the same in operation after doubling present capacity. About 600 looms will be added. The spindles, now numbering 8,000, will be increased to 15,000. The Ada Mill had recently passed into the hands of a receiver.

Pennsylvania, Philadelphia. Work is nearly completed on the new mill for the North American Mfg. Co., Glenwood Avenue and Eighth St. The principal output will be lace curtains. Plant will be equipped with about 100 machines.

Pennsylvania, Philadelphia. Messrs. Daniels & Kane is the name of a new concern just started up in Frankford manufacturing damasks in the Dale Mill.

South Carolina, Anderson. The Anderson Phosphate & Oil Co. will install machinery for manufacturing cotton rope in the mill instead of batting, as was at first contemplated. Contract has been awarded for the machinery, which they expect to have running by December. Will have weekly output of about 3,000 pounds.

*South Carolina, Central. Contracts have now been let for the erection of the new buildings for the Isaqueena Mills. The main building will be 275 by 105 feet, two stories, brick, with power house, 100 by 40 feet, one story. Standard print cloths will be made. O. A. Robbins of Charlotte, N. C., is engineer in charge of construction. As has been previously reported, this plant will be equipped with 10,000 spindles and 325 looms.

*South Carolina, Gaffney. E. R. Cash, interested in the Marie Mills, capitalized at $100,000, states that the plant will not be built this year.

*South Carolina, Greenville. The Woodside Cotton Mills have completed erection of the new buildings and are installing the machinery equipment, 11,280 spindles and 300 looms. It is reported that they contemplate increasing number of spindles in time to 30,000.

*South Carolina, Laurens. Work is nearing completion on the Watts Mills, a large part of the machinery having been installed. This plant, when completed, will have an equipment of 30,000 spindles, with looms.

*South Carolina, Laurens. The new Watts Mills are expected to be in operation by Jan. 1, 1904. John T. Abney, superintendent of the Laurens Cotton Mills will also have superintendency of the Watts plant.

*South Carolina, Ware's Shoals. Work is progressing on construction of the new building for the Ware's Shoals Manufacturing Co., plant being half built.

Enlargements and Improvements.

*Alabama, Piedmont. The work of installing machinery in the Coosa Mfg. Co.'s new mill is nearly completed. Some of it has already been started up. It is stated that the company will also make improvements in the No. 1 mill, installing new drawing frames, etc.

Alabama, Anniston. The Anniston Cordage Company has placed orders for additional machinery to be installed, consisting of cording machines, spindles, etc.

*California, Oakland. Work is about to start on construction of the new storage warehouse for the California Cotton Mills Co. The building will be 100 by 30 feet, brick.

Georgia, Rome. The Anchor Duck Mills are installing considerable machinery in the plant. They will install 3,500 more spindles and 100 looms.

Maine, Lewiston. The Nelson-Canwell Mfg. Co. is installing machinery for manufacturing lamp wicks.

Maine, Lewiston. The Androscoggin Mills have adopted the American Moistening Company's system of humidifiers.

Massachusetts, Boston. The Boston Thread & Twine Co. is to build a one story addition, 10 by 115 feet, to the dye house and storehouse of the mill at Jamaica Plain.

Massachusetts, Clinton. The Lancaster Mills are to mercerize their own yarns and will install a plant for same.

Massachusetts, Easthampton. A number of new looms are being installed in the Glendale Elastic Fabrics Co.'s plant at Glendale.

Massachusetts, Fall River. The Davis Mills have adopted the American Moistening Company's system of humidifiers.

*Massachusetts, Fall River. Contract has been awarded for the extensive improvements to be made to the Conanicut Mill. The picker room will be 57 by 38 feet, two stories; carding room, 154 by 56. An addition will also be built to the weave shed, doubling its capacity.

*Massachusetts, New Bedford. The Soule Mills expect to have the new addition, upon which work has recently begun, ready for operations about Jan. 1st, 1904. They will install 40,000 new spindles and 800 looms.

Massachusetts, Northbridge. An addition, 300 by 100 feet, brick, two stories high, is to be built by the Paul Whitin Mfg. Co. Additional machinery will be installed. A storehouse, upon which work of foundations have been started, will also be erected. The company makes fancy cotton goods.

Massachusetts, Springfield. The Springfield Webbing Co. has increased the capital stock by $10,000. Company was incorporated with capital stock of $15,000.

New Hampshire, Manchester. The Amoskeag Mfg. Co. have placed a large order for humidifiers with the American Moistening Company, Boston, Mass.

Pennsylvania, Philadelphia. Charles Felstein & Co., now at 304 Master Street, have purchased the building formerly occupied by Harvey Quicksall, 4274 Paul Street, Frankford. The buildings are now being put in condition and the machinery will be put up at once. The production of this company is hair cloth on 20 looms.

Pennsylvania, Philadelphia. J. & W. Wardlaw, who have been operating 30 looms on table damasks at 1545 Ruan Street have removed to their new building 1615 Foulkrod Street, the proportions of which are 128 by 45 feet, two stories high. They report a fair business employing 24 hands and selling their goods through New York.

Pennsylvania, Philadelphia. The Taylor Textile Company, located in the Dale Mill, Gillingham St., for some time, is about to remove to the Wardlow Mill, 1615 Foulkrod St. The company manufactures upholstery goods and novelties on 14 looms, which they will greatly increase as soon as they are fixed in their new quarters.

South Carolina, Anderson. Application has been made by the Brogon Cotton Mills for privilege of increasing the capital stock from $500,000 to $1,000,000.

South Carolina, Columbia. The Capital City Mills have started work on erection of an addition 100 by 86 feet, in which they will install 8,648 new spindles and 70 looms. They now operate 6,200 spindles and 200 looms.

South Carolina, Inman. Work has been started on an addition to the Inman Cotton Mills. They will install new machinery in same as soon as possible. A large warehouse will also be erected.

South Carolina, Whitmires. The Glenn-Lowry Mills are installing 125 additional looms in the plant. Additional carding machinery will also be added.

*Virginia, Petersburg. The Chesterfield Manufacturing Co. has started work on a dam to develop 250 h. p. and enable them to discontinue use of steam as motive power. New machinery will be installed to the present equipment for manufacturing yarns. They have discarded the looms.

Mills Starting Up.

Massachusetts, Conway. James Hennessey of Garfield, N. J., has leased the Delabarre Mills, which have been idle for a number of years. P. H. Walsh is superintendent of the plant, which will be started up about October 1st., making men's suitings. Some new machinery is being put in.

*Massachusetts, Pittsfield. The Pittsfield Cotton Mills have resumed operations. During shut down a new water wheel was installed to run dynamo of electric light plant put in.

*North Carolina, Concord. Operations have been started up in the No. 4 mill of the Odell Mills Co.

*New York, Valiatie. The Harder Manufacturing Co., has resumed operations.

Pennsylvania, Wilkesbarre. The Sun Narrow Fabric Company, which was shut down about a year ago on account of a flood, it is reported will be put into operation again in the near future. Mr. H. Mattershead, the manager of the old concern, who has been in Philadelphia and will return to Wilkesbarre in a short time, states that he has been endeavoring to interest capital in his enterprise and has been partly successful, and hopes in a short time to have the mill again in operation.

Mills Shutting Down.

Connecticut, Mystic. The Mystic Twine Co. has been compelled to close the plant on account of the high price of cotton.

WOOLEN.

New Mills.

*Canada, St Jacobs. The Canada Felting Co., Ltd., capitalized at $50,000, expects to begin operations about Oct. 1st, making felt boots and shoes. They have secured an old woolen mill, to which an addition has been built. They wish to purchase two more 48 by 48 inch cards, in good order. E.

W. B. Snider is president of the company; Alfred Snyder, treasurer, and Edward Ross, superintendent. Plant is equipped with a dye house. Goods are to be sold direct.

*Massachusetts, Holyoke. The International Felting Co., which has been recently organized with capital stock of $75,000, has started operations.

*New Hampshire, Laconia. The Laconia Woolen Co., capitalized at $50,000, will occupy the plant formerly known as the Guilford Hosiery Co. They are putting in a new flume and 125 h. p. boiler. E. F. Burleigh is president of the company; Fred A. Young, treasurer, and Albert Crabtree, agent and superintendent. The plant is to be started with 4 sets cards and 10 looms. The plant is so arranged as to accommodate 6 sets cards and 40 looms. They expect to begin operations Nov. 1st, making cotton warp dress goods. A dye house is attached to the plant. Plant is operated by water power.

New Jersey, Braddock. A new rug mill is under construction at this place for Wm. Brimfield. The engine and boiler have been installed. The roof is being put on the building.

New York, New York Mills. The New York Mills have completed erection of three story addition to their No. 4 mill, to be used as packing room for storage of yarns.

New York, Oswego. The Ontario Knitting Co., which recently secured the Standard Yarn Company's plant, will build a one story brick building for a cotton opening room. This building will form part of a large four or five story brick storehouse to be built later by the concern. Much of the old machinery in the plant has been taken out and is being replaced with new for the manufacture of cotton yarn. The mill has been idle for some time.

New York, West Park. The Northern Wadding Co. has secured the carding machinery formerly used in the Titus Mills and will utilize same in their cotton batting mill.

North Carolina, Greensboro. The Revolution Cotton Mills are enlarging the capacity of the plant.

*North Carolina, Spray. The Morehead Cotton Mills, now operating 3,136 spindles, are installing 4,256 more. The mill was built large enough to accommodate additional machinery.

*Pennsylvania, Aston Mills. Operations will be resumed shortly in the plant formerly occupied by Rhodes Bros., by the May Mfg. Co., recently organized. A mixed line of cotton and woolen dress goods will be made. Joseph H. Parven is interested.

*Pennsylvania, Harrisburg. The new Harrisburg Woolen Co., which is to start operations in the old match factory, expects its first installment of machinery this week. The factory is now being cleared out and the machinery will be set up at once. Mr. Roebuck, the superintendent, who has equipment of the plant, is expected on the ground the last week in September and it is expected that the plant will be in full operation by the end of October.

Pennsylvania, Philadelphia. The Unity Woolen & Worsted Company is the name of a new establishment in the Aramingo Mills, Frankford. The company will manufacture ladies' and gents' fine woolen and worsted cloths, employing 20 hands and selling the goods direct. Eight looms have already been set up and will be put in operation at once. The entire equipment to start with, will be 20 looms. Mr. William Barras is the manager and will also superintend the operations of the plant.

*Rhode Island, Wakefield. The Wakefield Manufacturing Co., which expected having the plant ready to start operations September 1st, will be somewhat delayed in starting same as the machinery is not in readiness. Operations will start in about six weeks. F. B. Rollinson is superintendent of the plant.

*Virginia, Salem. The new concern recently incorporated to rebuild and operate the Salem Woolen Mills, is known as the Worden Manufacturing Co.

Enlargements and Improvements.

*Connecticut, Norwich. The Reliance Worsted Co., Woonsocket, R. I., is starting up their new plant in the old car shops, previously reported purchased by them. The machinery of the Leinbach Woolen Co., which plant was purchased, has been installed there. They will remove the Woonsocket plant to the same building as soon as it can be conveniently done. They propose running 10 sets of cards and 60 looms, with dyeing and finishing, on woolens and worsteds.

California, Marysville. The Marysville Woolen Mills have recently added ten new blanket looms.

Connecticut, Somerville. Work has been completed on a new storehouse, 144 by 75 feet, brick, for the Somerville Mfg. Co.

Connecticut, Staffordville. Frederic Faulkner, who has been operating the Faulkner Woolen Mills at Stafford Springs for a number of years, has leased the mill property at this place. The plant leased has not been running for some time.

Indiana, Evansville. The Evansville Woolen Mill Co. have recently installed 12 additional looms in the plant, giving a total of 50 broad fancy looms.

Indiana, La Porte. Samuel Cox's Sons are to increase the capacity of the plant. A new addition will be built to the mill. They will install a new wool washer and some dyeing and finishing machinery.

*Maine, Dexter. Two new jacks, of 280 threads each, have been installed in the Morrison Woolen Co.'s new addition. It is reported that other machinery will be added for increasing the capacity of the two plants.

Maine, Lisbon Falls. The Worumbo Manufacturing Co. is installing a new wool dryer to replace three old ones.

*Maine, Madison. The Madison Woolen Mills, previously reported to be shut down for extensive repairs, will also put in two sets of new cards. They have started work on the changes.

*Maine, North Berwick. Although the new dye house for the North Berwick Co. is not wholly completed, they have started using same.

Maine, North Vassalboro. Repairs and additions are being made by Herbert Pease to his shoddy mill.

Maine, Pittsfield. Extensive improvements have been started upon the plant by the Waverly Woolen Co. Eight additional looms will be placed in the weave room. It is expected that a new wool house will be erected shortly.

Maryland, Baltimore. Some additional machinerry (purchased) is to be installed in the Maryland Woolen Co.'s mill.

Massachusetts, Holyoke. The Holyoke Plush Co. is to make some additions and changes to the mill. A building, 150 by 50 feet, one story, will be built for a dye house. They will also build an addition to the main mill.

*Massachusetts, Pittsfield. The Helliwell Manufacturing Co. contemplates enlarging the plant. The report that they might utilize the Pomeroy plant is not correct.

Michigan, Detroit. Work has been started on erection of a new mill for the Pioneer Woolen Mills, manufacturers of astrachan and Buffalo robes.

New Hampshire, Newport. A new picker has been installed in Dexter Richards & Sons' mill.

New Hampshire, Tilton. New looms have been installed in O. & E. Morrison's woolen mill.

Ohio, Cleveland. A new set of cards with mules will be installed in the Collings, Taylor Co.'s plant.

*Oregon, Oregon City. Bids are being called for by the Oregon City Mfg. Co. for rebuilding the plant recently destroyed by fire. It is hoped by the company to resume operations about the middle of October.

Pennsylvania, Clifton Heights. The Colonial Manufacturing Company, Welsh & Dick, are about to remove their establishment from 2627 Mutter Street, Philadelphia, to the mill formerly operated by Garnett Bros. as a shoddy plant. The company makes a business of weaving and printing Turkish towels and are operating six looms, which will be increased to 30 looms when they are fully settled in their new plant. It is also their intention to put in a new bleachery.

Pennsylvania, Conshohocken. An additional story, 300 by 75 feet, is being built to the Merion Worsted Mills plant. A new office building is also to be erected.

Pennsylvania, New Cumberland. The Susquehanna Woolen Company, Inc., have just doubled their spinning and yarn making capacity and increased their power plant by putting in new engines and boilers. The company has recently put in new looms and will add more in the near future. They are now considering the matter of the erection of a large ware room and annex to the mill and will also put in new wool washing and drying machinery. They are very busy manufacturing wool blankets which they dye and sell direct.

Pennsylvania, Philadelphia. R. H. Shaen, 2636 Mascher Street, is manufacturing worsteds for men's wear on 24 looms. He reports having orders enough on hand to run full time up to the end of November and has added four new dobbies and one new spooler and is also making changes in his power department. The goods are sold direct. Thomas E. Whitehead is the superintendent.

Pennsylvania, Philadelphia. The Saxonia Dress Goods Mills, Howard and Palmer Streets, owing to the large amount of business on hand, have been compelled to enlarge their building by adding three stories. This will make six stories and basement and will enable them to concentrate their plant, which is somewhat distributed, in this vicinity. The company manufactures fancy dress goods and worsteds with 68 looms. Mr. Fred. Eick is the superintendent and buyer.

*Pennsylvania, Philadelphia. The Brighton Worsted Company has been incorporated by Charles F. Sloan with a capital of $50,000. The concern was formerly known as the Brighton Worsted Mills and run on woolens and worsteds for men's wear at 107 Palmer street. The officers are Charles F. Sloan, president, and D. F. Greenwalt, secretary and treasurer, the goods being sold through a New York house. Twenty-four broad looms are being operated and one new warping machine has just been set up.

Pennsylvania, Philadelphia. The Philadelphia Axminster Carpet Company, 10th and Diamond streets, reports business as being in a flourishing condition. Orders have been given out for a number of new looms, which will be put in operation as soon as they are delivered.

*Pennsylvania, Philadelphia. Joseph Shaw, for some time manufacturing shoddy and waste at Dyre and Willow Streets, Frankford, is now located at Germantown in Shaw's Mill on E. Chelten Avenue, which was formerly used as a leather factory. Mr. Shaw operates 1 picker, 1 willow and two garnett machines, one of which he recently put in.

Pennsylvania, Philadelphia. John Hamilton & Sons, manufacturers of ingrain carpets, are to start making velvet carpets also. The necessary machinery has been ordered.

Rhode Island, Centredale. A new office building is nearing completion for the Centredale Worsted Mills.

Rhode Island, Glendale. Ground has been broken for an addition to be made to the Glendale Woolen Mill, William Orrell, proprietor. Additional carding and spinning machines will be installed.

Rhode Island, Shannock. The Shannock Narrow Fabric Co. has recently increased the capital stock from $10,000 to $20,000.

Rhode Island, Westerly. Improvements are being made to the Pawcatuck Woolen Co.'s plant. A water tank nearly 100 feet high has been set up

on the tower of the stone mill. They have also purchased some additional spinning machinery.

Tennessee, Athens. About 35 new looms are being installed in the Athens Woolen Mill, making woolen and cotton mixed goods.

Mills Starting Up.

*Massachusetts, Barre. The top mill in which Francis Willey & Co. are interested, is completed, and will begin the production of tops this week.

*Massachusetts, Pittsfield. The Pittsfield Yarn Mills will operate the plant of the Pittsfield Mfg. Co., making fine all-wool yarns in full fancies. New machinery has been installed and operations begun. James O. Purnell, is agent of the plant.

*New York, Waterloo. The Waterloo Woolen Mills have resumed operations after being closed for a month, during which time a general overhauling has been made of the plant and machinery equipment.

Pennsylvania, Philadelphia. After being shut down for three months, the Girard Worsted Mills, Mr. E. K. Bready, proprietor, Howard and Huntingdon Streets, is again in full operation on orders taken last May. Fifty-eight looms are operated on dress goods and novelties in this mill.

KNIT.

For Knitting Mill News, see Knitting Department.

SILK.

New Mills.

Massachusetts, Boston. The Boston Artistic Silk Weaving Company has recently established a plant at 74 India Street, for making narrow silk fabrics. Matthew Wickman is general manager of the plant.

*New York, Fultonville. The Fultonville branch of the Amsterdam (N. Y.) silk mills has been placed in operation with about 35 operatives. As rapidly as the sewing machines can be installed the number of hands will be increased, the plan being to employ 80 girls.

*Pennsylvania, Erie. At a meeting held recently by the stockholders of the proposed new silk mill, W. B. Flickinger was elected the Erie director. Mr. M. C. Migel is president of the company and I. A. Talman, New York, secretary and treasurer.

*Pennsylvania, Nanticoke. A. L. Storms & Co., of Weissport, expect to have their new mill, upon which work of construction has begun, ready to start operations about the first of December. They will install 8,000 spindles for silk throwing. This concern is capitalized at $40,000. A. L. Storms is president and superintendent of the company, and N. Everett, treasurer.

Pennsylvania, Philadelphia. Messrs. Jos. J. Scheiter & Co. have recently started up in the manufacture of silk and cotton goods in Frankford with 20 looms. The company consists of Joseph J. Scheiter and David W. Spence. The goods are sold direct from their downtown office, 68 N. Third Street.

*Pennsylvania, S. Bethlehem. The Iroquois Silk Co., reported incorporated last April, has not yet started business, and it will be some time before they do.

Enlargements and Improvements.

*New Jersey, Haledon. The Columbia Ribbon Co. will rebuild their mill, recently destroyed by fire, as soon as possible. They have secured temporary quarters where goods are being made for the present.

*New York, Whitehall. Work is under construction on the one story addition, 65 by 35 feet, to be built for the Champlain Silk Mills. This is to be used as a wash house and is expected will be ready for operation in about a month.

Pennsylvania, Lebanon. The silk mill started in this town by the Miller & Ward Co. of Paterson, N. J., is very busy on black taffetas and dress silks. Forty looms are now being run full time out of 120 with auxiliary machinery, etc. One hundred and ten hands are employed, with Mr. Hugh Miller, who was at one time with Pelgram & Meyer of Paterson, as fixer, as superintendent. A two-story addition of brick 190 feet, will be put up during March of next year to be used as a weaving shed.

*New Jersey, Carlstadt. Work has been nearly completed on the three story addition to the Scharg Bros.' silk mill. They expect to occupy same in about a week.

New York, New York. Woodhouse, Bopp & Co. have consolidated with the Pittsburg Silk Manufacturing Co. at West Pittsburgh, Pa., and later on will remove the plant to latter place. The capital stock has been increased $50,000.

Mills Shutting Down.

Pennsylvania, Philadelphia. F. F. Wolgamuth's Sons, operating 30 looms on silk and cotton goods at Mascher and Turner Streets, owing to the high price of raw material, have been compelled to shut down for a short time until the market is in a better condition.

MISCELLANEOUS.

New Mills.

Pennsylvania, Allentown. Thomas Pickup and Thomas Kean, formerly with the Wahnetah and Dery Mills at Catasauqua, have started a small plant here for dyeing cotton goods.

The American Moistening Company, Boston, Mass., report a large volume of business for this season. The mills having deferred their orders for humidifiers are now placing the same in view of the advantage of an air moistening system during the winter.

The Curtis Publishing Company, Philadelphia, Pa., have adopted the American Moistening Company's system of humidifiers.

Personals.

PERSONALS.

Cotton.

Louis Brown, overseer of carding and spinning at the Spalding Cotton Mill, Griffin, Ga., has resigned.

W. J. McLendon has resigned as superintendent of the Wadesboro, N. C., Cotton Mills.

Edward H. Bean has resigned as overseer of slashing and drawing-in department of the Globe Mill, Woonsocket, R. I. He has held the position for the past five years. His friends in the mill presented him with a gold ring suitably inscribed.

J. S. Cole, late of the Revolution Cotton Mills, Greensboro, N. C., has taken a position as overseer of spinning with the Darlington (S. C.) Cotton Mill.

Dillon Earon, late of Beauport, Canada, has recently accepted the position of overseer of carding with the Deane Plaster Company, Yonkers, N. Y.

A. Culberson of Allison, Ala., has been elected superintendent of the cotton mills of the Gaffney Mfg. Co., Columbia, S. C.

W. D. Cooksey, who has had charge of the spinning at the Durham Cotton Mills, East Durham, N. C., has become overseer of spinning at one of the Gaffney (S. C.) Mills.

Eugene S. Graves has accepted the position of foreman of the chemical department of the New Bedford (Mass.) Textile Co.

J. T. Carter has again taken his old position at the Nokomis Mills at Lexington, N. C., as assistant superintendent.

John H. Greenwood, who for the past 15 years has been overseer of the weaving department of the Globe Mill of the Manville Co., Woonsocket, R. I., concluded his duties there Sept. 12. The help in the weaving department, wishing to show their esteem, gathered around Mr. Greenwood's desk and he was presented with a gold watch by them.

R. A. Wilson, Sr., from McAdenville, N. C., fills the vacancy at the Arlington Cotton Mill, Gastonia, N. C., caused by the recent death of W. A. Arney, overseer of carding.

Robert Holland, overseer of weaving, late of the Hamlet Textile Co., Woonsocket, R. I., is now with the Clinton Mfg. Co., Woonsocket.

C. P. Thompson, who recently resigned from the position of overseer of spinning at the Tryon (Ga.) Cotton Mills, has taken charge of the spinning at one of the Pelzer Mills, at Pelzer, S. C.

G. Y. Busbee, formerly of the Orangeburg Mfg. Co., is now overseer of weaving at the Abbeville, S. C., Cotton Mills.

H. A. Rademacher, chemist at the Arlington Mills, Lawrence, Mass., after an absence of some ten years, has removed his family back again to Methuen, Mass., where he occupies the Craven residence on Oakland Avenue.

Thomas Yeomans has secured the position of overseer of ring spinning at the American Linen Co., Fall River, Mass., succeeding Thomas E. Gallishans.

Woolen.

James C. Burns, who has been overseer of spinning department of the American Woolen Mills, Winooski, Vt., has resigned.

Edward Burkhart is the new carder at the Saxton's River Woolen Mill, Saxton's River, Vt.

W. V. Brodmerkle has resigned as designer at the Worumbo Mfg. Co., Lisbon Falls, Me.

M. C. Mullen is overseer of carding at the Baltic Mills, Enfield, N. H., having succeeded A. Talbert.

Frank Bruce, who has been overseer of the twisting department at the Taconic Mills, Pittsfield, Mass., has been promoted to another department of the mill.

Charles Bramley of Norwich, Conn., has succeeded W. H. Wilcox as night carder at the No. 4 mill, Warren, Mass.

John E. Norris, overseer of the fine drawing and burling department of the Burlington Mills, Winooski, Vt., has resigned, having secured a position in Boston.

George W. Smith will be the overseer of spinning at the Wakefield Mill, Wakefield, R. I.

Gilbert J. Lees, late of Philadelphia, has accepted the position of second hand of spinning for the Somerville Woolen Mills, Somerville, N. J.

Thomas E. Smith, overseer of weaving, has changed from the Westerly (R. I.) Woolen Co., to the Reliance Worsted Company, Norwich, Conn.

W. A. Tucker of Westerly, R. I., is superintendent of the Airlie Mills, Hanover, Conn.

Ellis Hartley, for the past year overseer in the twisting department of the Southwark Worsted Mills Co., Philadelphia, has resigned.

J. R. Emmett is dyer at the Singleton Worsted Mill, Franklin, Mass., having succeeded James Lockwood.

Deaths.

William Adler, of the firm of Adler & Co., proprietors of the Fairmount Woolen Mill of Cincinnati, O., died at his home on August 28th.

Otis L. Farley died at Haverhill, Mass., and burial was held at Newburyport on Tuesday, the 22d.

Prescott C. Bridgham, senior member of the woolen firm of Bridgham & Co., of Boston, and an old resident of Newton, died suddenly August 31st.

Isaac Walker, cotton manufacturer, of Frankford, Philadelphia, died at his home on Penn St., of heart disease, recently. He was 63 years old, and a member of the Walker & Richardson Cotton Mills Co. He was a cotton spinner by trade and came to this country from Devonshire, England, forty years ago.

Allen McPherson, 77 years old, died in Philadelphia recently. He was a veteran of the Civil War, and for many years an inmate of the Soldiers' Home. Before the war he had carried on the carpet weaving business in Kensington.

Donald Mackay, a prominent resident of Troy, N. Y., died last month. Mr. Mackay was born in Scotland about 70 years ago. He learned in youth the work of a weaver, and when he came to this country found employment in the mills at Watervleit and Cohoes. He started a knit goods mill at Bluestone, near Hudson, and operated it successfully until the building and machinery were destroyed by fire. Then he took up his residence in Troy and had since resided in that city, a period of forty years.

Thomas Cunningham, president of the James Smith Woolen Machinery Co., of Philadelphia, Pa., died recently, aged eighty-six years. He had been president of this company since 1877. The deceased was born in Spencer, Mass., April 9, 1818. He leaves two daughters.

O. L. Farley died at Haverhill Sept. 20. He was at one time an overseer at the Naumkeag Cotton Mills, Salem, and also agent of the Victoria Mills, Newburyport.

James Beless died recently. The deceased was one of the pioneer knit goods manufacturers of Needham, Mass., and one of its oldest citizens. During the Civil War and for some time after, Mr. Beless carried on a large business, but the advent of power machinery, coupled with losses received in the endorsement of notes for a prominent Boston business house, resulted in financial reverses from which he never fully recovered. He retired from business in 1898.

James Livermore died September 8 at Blackwood, N. J., at the age of 101 years. He was formerly a well known woolen manufacturer, having established the Good Intent Woolen Mills, at Blackwood, in 1830, which he continued to operate for more than thirty years. The deceased, up to the time of his death, retained all of his faculties. Death was due to the shock of falling down a flight of stairs and breaking one of his legs.

George Walter Abbott, president of the Amos Abbott Woolen Mill, Dexter, Me., died of heart failure September 17th. He leaves a wife and one son and one daughter. He was 45 years of age.

Andrew G. Pierce, a well known mill man, and for more than 40 years connected with the Wamsutta Mills, New Bedford, Mass., as treasurer and president, died September 11th. Mr. Pierce graduated from the New Bedford High School and began his business career as clerk with Edward L. Baker of New Bedford, manufacturer of oil and candles. When the latter became treasurer of the Wamsutta Mills, at the organization of the corporation, Mr. Pierce remained with him as clerk. He was elected treasurer of the Wamsutta Mills in 1855, at the age of 26 years, and its president in 1885. He was also a director of the Morse Twist Drill & Machine Co., the Potomska Mill and other industries. When the New England Cotton Yarn Co. was organized in 1899, Mr. Pierce became its president.

John Edwin Atwood, one of the best known inventors and manufacturers in New England, died at Stonington. He was born in Mansfield, Conn., in 1822. His father was one of the pioneers of the silk industry in the United States. Not only did he manufacture the sewing silk, but also cultivated the silk worm and handled the raw material from the cocoon through its various processes up to the finished article. At a very early age Mr. J. E. Atwood worked with his father in raising the mulberry trees upon which the silk worm lived, and also mastered every detail of the business as it was carried on in those days. About 1850 he engaged in the manufacture of silk machinery in a small way in the vicinity of Willimantic. In 1876 his place of business was destroyed and he came to Stonington and started the Atwood Machine Company in association with his only son, Eugene Atwood. In 1898 the Atwood Machine Company absorbed the Morrison Machine Co. under the title of Atwood-Morrison Company, which today is the largest manufacturer of silk machinery in the world. Mr. Atwood had many friends, all of whom held him in high regard.

The founder of the Pettee Machine Works, which later became merged into the present Saco and Pettee Machine Works, died at the residence of his son, Otis T. Pettee, Newton Upper Falls, Mass., on Sept. 9.

Mr. Pettee has been in rather feeble health for several years, but has been able to ride about in a carriage or automobile up to the day of his death.

Otis Pettee was born in the Upper Falls, Dec. 5, 1823, and is a son of Otis and Matilda (Sherman) Pettee. His father was the founder of the Pettee machine works, the predecessors of the Saco and Pettee machine works of today.

Mr. Pettee received his education in the Newton schools and then entered the machine works with his father and became interested in the manufacture of cotton and cotton machinery, continuing in business until 1881. Mr. Pettee has had a long and distinguished service in the town and city government, having been a selectman in 1857, 1858, 1870, 1871, 1872 and 1873 and its chairman for the two later years, and assessor in 1862, 1863 and 1864, town auditor in 1866, 1867, 1868 and 1869, an alderman in 1874, 1875, 1877, 1878 and 1879 and president of that body in 1874 and 1875. He has also served for seven years on the board of health and its chairman the greater part of the time, three years as an assistant assessor, as a trustee of the Newton Cemetery since 1864 and twenty-two years as its treasurer, and has been a trustee of the Newton Hospital since its organization.

Mr. Pettee married Miss Julia Maria Smith of Needham, and has one son, Otis T. Pettee, of Newton Upper Falls.

New Publications.

Cotton Mill Commercial Features; by D. A. Tompkins. Price $5.00.

This work has been before the public for some time and met with very gratifying success. It was written, as the author says, to give an answer to many inquiries received by him for full information about the cotton manufacturing business. It contains a large amount of historical and technical information and will be found of great value to those who are engaged or contemplate engaging in the manufacture of cotton goods. Following is an outline of the table of contents:

Cotton as a factor in progress; values in cotton; organization of company; location and surroundings; raising capital; investments, costs, profits; book-keeping and accounting; labor; operatives' homes; power; sale of products; textile education; road building and broad tires; farm and factory; miscellaneous; statistical table and notes.

Cotton Mill Processes and Calculations; by D. A. Tompkins. Price $5.00.

This is a hand book on cotton manufacturing, designed to place before the reader a concise statement regarding the various processes of cotton manufacturing and an explanation of the calculations which a cotton manufacturer is constantly called upon to make. Following is an outline of the table of contents:

The picker room; carding; drawing; railway heads; hanks and numbers; slubbing and roving; ring spinning; mule spinning; preparation of yarn for weaving; weaving; loom supplies; the cloth room; preparation of yarn for market; organization and equipment.

Methods of Cost Finding in Cotton Mills; by W. G. Nichols, price $1.50.

The question of cost finding is of vital importance to every manufacturer and it is a particularly difficult question in the textile industry owing to the great variety of fabrics made in the same mill. This book gives a system of estimating cost of textile manufacturing so as to enable the manufacturer to estimate closely the cost of individual fabrics, and to compare the cost of operating his mill at different periods. The author does not lay down hard and fast rules for cost estimating—his treatise is too broad for that. He presents to the reader methods which he has found to be practicable, explains their general principles and points out the necessity of modifying them to suit individual circumstances. The book is freely illustrated with blanks to be used in calculating mill statistics and making estimates. It is concise and business-like, and manufacturers will have no difficulty in applying the systems to their own mills. Though treating of cost finding in cotton mills it will be found of great value to manufacturers engaged in other branches of the textile industry.

The World's Commerce and American Industries; John J. Macfarlane, A. M.; Philadelphia Commercial Museum, Philadelphia, Pa. Price 50 cents.

The commerce of the world is here presented in graphic form. The readers of the Textile World Record are familiar with this method of presenting statistics which has been employed at various times. The idea has been greatly extended in this pamphlet by Mr. Macfarlane with very good results. Each chart is accompanied by a table of statistics, also a written explanation.

Bulletin of the National Association of Wool Manufacturers, Boston, Mass., September, 1903.

This number is chiefly interesting as containing the valedictory of Secretary S. N. D. North, in which he reviews the history of the organization during his incumbency of office, and expresses his high appreciation of his associates. This is followed by Oriental and Occidental Rugs, an interesting and valuable article by Henry G. Kittredge, presumably based upon the work "Rugs Oriental and Occidental", by Rosa Belle Holt; The Paris Exposition of 1900, by M. Charles Marteau; Obituary Notices; Editorial and Industrial Miscellany; Decisions of the Treasury Department; and the regular Quarterly Review of the Boston Wool Market.

Industrial History of Florence, Vol. I., The Florentine Woolen Industry (Der Florentiner Wirtschaftsgeschichte); by Alfred Doren; J. G. Cotta, Stuttgart, Germany. Price $4.00.

This is a history of the woolen industry in Florence from the first recorded development in the thirteenth century. The author gives a general view of the technical processes in this industry and has brought to light some very interesting information regarding early textile processes. There is an interesting chapter on the wool trade, methods of transportation, credit system, etc. The development and progress of the house industry is described together with the life of the workers. Many old documents relating to the industry are reproduced, such as wage scales, inventories of mills, etc. The text is in German.

A Visit to Togo; A. W. Schreiber, Inspector of Missions; North German Missionary Society, Bremen, Germany; price 35 cents.

Togo is associated in the minds of many of our readers with the experiments of the German government to raise cotton and to which we have referred in past issues of the Textile World. Pastor Schreiber, the author of the book, while chiefly interested in missionary work, gives an interesting account of the people, their manners and customs, together with a description of the natural resources of the country. The many illustrations add much to the interest and value of the story. The text is in German.

Sericulture (Die Zucht der Seidenspinner), by Arnold Voelschow; Schwerin, Mecklenburg, Germany, price $1.25.

This is a detailed treatise on the raising of silk and will be especially interesting to many of our readers who are at present endeavoring to establish this industry in the United States. It is illustrated with a number of plates, some of them colored. The first section is a general treatise on sericulture. This is followed by a description of various species of silk worms; the concluding portion of the work deals with the value of the different species for different purposes and climates. The text is in German.

Silk; by Leo Vignon; J. B. Bailliere et fils, 19 rue Hautefeuille, Paris; 359 pages; price $2.00.

By a systematic arrangement and division of the subject the author presents in small space an unusually valuable treatise upon silk cultivation and the manufacture of silk products. The introduction treats of the raising of the cocoon. The first part is an account of the processes for converting the cocoon silk into yarn. The second part is devoted to the manufacture of silk fabrics including dyeing and finishing. The concluding section is statistical and shows the distribution of the silk mills and their products throughout the world. The work is freely illustrated and will prove a valuable handbook for those engaged in the silk industry who can read the French text.

Silk in the Far East and French Colonies (Les Soies dans l'extreme orient et dans les colonies francaises) by Dr. Hubert Jacob de Cordemoy; Augustin, Challamel, 17 rue Jacob, Paris; Price, $1.75.

This book treats of silk raising in China, Japan and India, Indo-China and Madagascar, the West Coast of Africa, French Guiana, Algeria and Tunis. It contains much valuable information concerning the present state of the industry in each of these countries, the best species for each location, etc. The text is in French.

Business Literature.

"With a Telephone at Your Right Hand, Your Department's at Your Command." Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y., and Chicago, Ill.

This is a circular illustrating the various types of the Stromberg-Carlson telephones built by this concern and specially designed for separate systems in manufacturing establishments. In cities or towns where independent telephone systems are operated these telephones can be so equipped that any department can talk with parties on the town lines.

Asbestos, Catalogue A., H. W. Johns-Manville Co. 100 William St., New York.

A very complete catalogue and price list of the many asbestos products manufactured by the above named firm. An index affords ready reference to any desired article.

The New Mason; The Mason Regulator Co., Boston, Mass.

A pamphlet describing the Model C Automobile Engine, built by the Mason Regulator Co., which is giving entire satisfaction wherever used.

Keasey Split Wood Pulleys; The Keasey Pulley Co., Toledo, Ohio.

A booklet illustrating and describing the Keasey pulleys made with malleable iron hubs. The list gives the dimensions, prices and various sizes, together with letters from satisfied users of these pulleys in various parts of the country.

Centrifugal Dyeing Machine.

Messrs. A. Klipstein & Co., 122 Pearl St., New York, are now introducing the patent centrifugal dyeing machine, which has been previously described in the Textile World Record. It is now in successful use in this country, for a variety of purposes, particularly for the dyeing of yarns and hosiery in compact form, whether in shape of weft of twist cop, cone or bundle.

The principle of the machine is that of the hydro-extractor covered in, and it has a partitioned cage, which receives perforated boxes packed with cops or other materials. Dye or other liquor is introduced and forced through these boxes, which are fitted around the revolving cage, and the liquor is thus thrown centrifugally through the material with uniformity and certainty.

The machine dyes all the direct colors, as well as the new fast sulphur blacks.

The feature upon which special emphasis is laid is that it eliminates several processes in the manipulation of dyed yarns. The ordinary system requires that the yarn shall be wound from cops into skein in order to dye, and after dyeing it has to be rewound into cone, spool or other form, whereas with this machine the yarn is dyed directly in the cop as stripped from the mule spindle, and can be used without any of these processes. Ring yarns, instead of being skeined, may be wound direct on the cone and so dyed.

The capacity of 72-inch machine on sulphur blacks is stated to be 1,000 pounds per day minimum, and the result in saving in the winding and rewinding processes is figured at a large amount.

A circular descriptive of the machine and claims made for it has recently been issued, and will be sent upon application.

Artificial Niagara at St. Louis.

An immense artificial cascade has been determined upon by the authorities of the Louisiana Purchase Exposition as the centrepiece of the semi-circular lay-out of the principal buildings. The cascade itself will be divided into three parts; a large middle cascade with a smaller one at each side, the water flowing directly into the head of the Grand Basin. In all, about 90,000 gallons of water per minute will be supplied at a head of 159 feet, forming the greatest artificial water effect ever attempted.

The water will be taken from the Grand Basin itself and will be raised to the top of the cascade by a pumping station located under Festival Hall. The pumping machinery will consist of three 36-inch single-stage, turbine centrifugal pumps purchased from Henry R. Worthington, of New York City, each driven by a 2000 horse-power Westinghouse alternating current motor. The total horsepower utilized will thus be 6000, making this the largest electric pumping station in the world. The pumps and other pieces of machinery for this plant are now being installed at St. Louis.

The Whittier Mills have closed their office at Springfield, and hereafter their office will be at the mill at Chattahoochee, Fulton Co., Ga., where all communications should be addressed.

Hosiery Embroidery Machines.

The popularity of embroidered hosiery has led to a large demand for a machine suitable for this purpose. The Bonnaz machines are largely used for hosiery embroidery and the American agent, John Fink, 201 Centre St., New York, has put out a large number of them the past year. They are built either for automatic or hand operation. Mr. Fink carries a full line of all necessary parts and supplies.

Harris System of Coal Combustion.

In the July number of Textile World Record there appeared a letter on burning soft coal smoke by Dr. John Brown Harris of Nashville, Tenn. This interesting account of Dr. Harris' experiments and the system of boiler furnace setting which he evolved as the result, excited very wide attention and interest among mill men. Already several such systems are being constructed in textile mills. Dr. Harris is now perfecting his arrangements for introducing it in a commercial way, and has already given agencies for different states. This furnace is so simple and at the same time so effective and economical in coal consumption with the attending result of doing away with the objectionable black smoke from soft coal that it seems likely to be widely adopted.

Low Rates to California and the West via Southern Railway.

Any one desiring to make a trip to California, Arizona, Mexico, New Mexico or other western points, either for business or pleasure, can do so now at a small cost.

Daily until November 29, 1903, inclusive, special one way colonist's tickets will be sold via Southern Railway at rate of $49.75 from Philadelphia to Los Angeles, San Francisco and other points, proportionate low rates from other points.

The Southern Railway operates on fast trains, tri-weekly, high class, personally conducted vestibuled excursion sleeping cars between Washington, Los Angeles and San Francisco without change, via Atlanta, New Orleans and El Paso, in which the double berth rate is only $7.00.

Excursion sleeping cars leave Washington on Mondays, Wednesdays and Fridays. Chas. L. Hopkins, Dist. Pass. Agt., Southern Railway, 828 Chestnut Street, Philadelphia, Pa., will take pleasure in furnishing all information.

The New Hemphill Machine.

The reception which this new automatic seamless hosiery machine is meeting by the manufacturers is very gratifying to the builders. The simplicity of the machine and the small number of working parts surprise knitters, and its solid construction and good workmanship appeal at once to the practical man.

John Hetherington & Sons.

In their annual report the directors state that notwithstanding that the textile industry generally has been in a depressed condition the trading profit (£22,672) is considerably more than double that of last year. During the year, in addition to ordinary repairs, the sum of £956 has been spent out of revenue on improvements to structure and rearrangement of plant. The new patent comber, mentioned in the last report, has met with the success which was anticipated for it; 245 machines are now working and giving entire satisfaction. A fire-proof metal mule carriage has been devised and patented by the Company during the year, and is meeting with much success. Large orders have already been received for this carriage, and the directors anticipate that its introduction will prove of future benefit to the Company.

Empty Oil Barrels.

We learn that many cotton and woolen manufacturers in New England, and perhaps elsewhere, have been in receipt of a circular letter from the Union Refining Co., 33 John St., New York, offering good prices for empty oil and extract barrels. If any of our readers have had dealings with this concern, we should be pleased to know with what results. The "Union Refining Co." has a letter box in the hall at the address given, and sublet a tiny space on the top floor of the building, which is apparently not used and alleged to have been hired so as to have the right to put the letter box in the hall. It might seem desirable for manufacturers to make satisfactory arrangements for payment before shipping barrels to this concern.

A Fall River Office.

The well known brokers, S. Marshall, Bulley & Son, with offices at Liverpool, England, Houston and Gainesville, Texas, and Savannah, Ga., have recently opened an office at 58 Bedford St., Fall River, Mass., which will enable them to serve the wants of their customers with even more promptness than heretofore.

Sizeoleum.

The Arabol Manufacturing Company, 100 William St., New York City, offer to the trade sizeoleum and soluble softening oil which they claim is equal to any sizing on the market. It is used with either corn or potato starch and gives a smooth strong sized warp, keeping the threads open so that they will separate readily in the beaming as well as in the weaving. Sizeoleum is also used for print cloths, warps, sheetings and domestics. The manufacturers guarantee that there is no tallow in it.

The River Spinning Co., Woonsocket, R. I., are planning to reduce their fuel account this coming winter by means of a Green Economizer, which has just been ordered.

The Davidson Propeller Fan.

From the increased number of orders received from the mills throughout the country by the Massachusetts Fan Co., Waltham, Mass., for their well-known Davidson patent propeller fan, they are led to believe that their product is well appreciated by practical mill men. The fans are designed for high rotation where it becomes necessary to run them at unusually high speeds. All parts entering into the construction of the fan are especially heavy and it is not necessary to order a special fan for such a purpose.

They have recently adopted a new style of bearing which is a considerable improvement over bearings usually furnished on such machinery. The lining of the box is of the best babbitt metal cast in a mould and should it become worn at any time, by taking off the cap the lining can be readily removed and a new one inserted, the whole operation not requiring more than ten minutes. These removable linings are carried in stock and can be obtained at any time with the absolute certainty that they will always fit. This is a decided improvement over the method of taking the apparatus apart and rebabbitting the box upon a piece of shafting of the proper size.

Another feature that will commend itself to all practical mill men is the elimination of at least 40 per cent. of the power required to drive the fan by the use of a ball thrust bearing against the rear journal box. The usual method is to provide an ordinary collar which presses against the rear journal box while the fan is running. This certainly takes up the thrust of the fan, but at the expense of considerable power, as grit and dirt are bound to work in between the end of the box and the collar. Their new thrust bearing consists of hardened steel balls set into a brass cage and surrounded by a cast iron collar which protects the bearing from grit and dirt. These features are provided on all standard Davidson fans from 18 to 60 inches in diameter.

The Massachusetts Fan Co. has sold a large number of Davidson fans during the past season and much of the time their factory has been run night and day. They have built from fifteen to twenty fans, with and without motors, for the public schools of Boston, Fitchburg, Medford and for the new Methuen High School; also for the public buildings at Ogdensburg, N. Y., Watertown, N. Y. and Baltimore Md. A considerable number of their fans have been installed in Harvard College and Dartmouth College. Among the mills the China Mfg. Co., Suncook, N. H.; Glenlyon Dye Works, Saylesville, R. I.; Sayles Bleacheries, Saylesville, R. I.; Brightwood Mfg. Co., North Andover, Mass.; Thomas & Lowe Mach. Co., Providence, R. I.; American Printing Co., Algonquin Printing Co., Fall River, Mass.; Aspinook Co., Jewett City, Conn.; Patton Paper Co., Appleton, Wis.; Riorden Pulp & Paper Co., Hawkesbury, Ont.; Hinckley Fibre Co., Hinckley, N. Y.; International Paper Co. and many others are among their recent customers.

Their apparatus is very fully described in their new Catalogue, No. 50, which can be had upon application.

Increased Facilities.

The well known firm of Geo. S. Harwood & Son Boston, Mass., have increased and modernized the facilities of their repair department with a view of greater promptness in the filling of orders for spike and strip aprons and general repairs for feeding and oiling machines. The Bramwell feeds built by them are known wherever the textile industry exists and the Spencerstock oiling machine is rapidly attaining the same position.

Fine Mercerized Work.

The Home Bleach & Dye Works, Pawtucket, R. I., are turning out some very fine mercerized work. Samples of mercerized embroidery yarn that we have recently seen show an exquisite line of colors, with high lustre, and yet free from all harshness. They have had a very busy summer, and are now steadily engaged on regular work for a large line of customers.

New Orders.

The American Blower Company of Detroit, Mich., have recently received orders for induced draft heating apparatus from Monaghan Mills, Greenville, S. C., Louise Mills, Charlotte, N. C., and the Crown Mills, Marcellus, N. Y.

The Canadian Manufacturer, Toronto, Canada.

With commendable enterprise this journal has incorporated in its September issue copies of the Canadian, American (Dingley Bill), British, Australian and South African tariffs. The Canadian and American laws are indexed and the whole series forms a very valuable work of reference for business men generally. Price for this tariff issue, 50 cents.

Going Abroad.

Mr. Robert C. Webster, manager for Barber & Colman, the manufacturers of the Barber knotter for spoolers, will spend the winter abroad on business. In his absence A. G. Rose, Jr., will be acting manager. Mr. Rose has been connected with the business for the past two years, and is familiar with all its details.

Big Brushy Coal and Coke Co.

Announcement is made of the transfer of all the property rights, title and interest in the Crooked Fork Coal & Coke Company to the Big Brushy Coal & Coke Company, with general offices at Harriman, Tenn., who assume all obligations. The Big Brushy Coal & Coke Company will be under the same management as has hitherto been the Crooked Fork Coal & Coke Company, the transfer of title being made for the purpose of facilitating the execution of the comprehensive plans of development mapped out by this company, already

the largest individual shippers of coal in that section. Their mines at Petros, Tenn., have a capacity of over 1,000 tons per day. The Brushy Mountain Coal has a great reputation as steam coal, and they supply many textile mills on contract.

A Cotton Department.

The English-Greene Co., of Providence, R. I., announces the addition to their business of a cotton department, with Mr. E. X. Andem as manager. Mr. Andem has been connected with the cotton business for 22 years, 15 of which were with one firm. Since that time he has spent three years in the South shipping cotton to domestic and European mills. Mr. Andem is familiar with the details and has had a large experience, both in the Northern and Southern cotton markets.

Dye Sticks.

Sticks for the new Hussong Dyeing Machine.

Frank Bailey of Cedar Brook, N. J., is making sticks for the new Hussong dyeing machine, as well as other makes of dyeing machinery. Mr. Bailey's sticks are made from the best lumber that can be obtained, and he stands back of his goods in every respect, and if, through no fault of his, there is any defect in the lumber, he makes it good without question.

German Immigrants.

Those interested in the development of the resources of the South are, to some extent at least, conversant with the methods employed by the Southern Railway Company in advancing the material growth of the country served by its lines. For several years past that Company has made special effort to attract to the South a desirable class of German immigrants. While this work is one that requires time, labor and patience, the results have been fairly satisfactory, and several settlements of that class of people have been established along the lines of the Southern Railway.

The success achieved by the Company has convinced it of the wisdom of redoubling its efforts, and it has decided to wage an active campaign, having for its purpose the location of a larger number of thrifty German farmers along the line. There is no better class of emigrant than the thrifty German farmer and such a settlement is always an important factor in the growth and development of the section of country in which it is located.

The Southern Railway Company will soon publish an illustrated pamphlet in German, the object of which will be to give reliable information concerning each of the Southern States tributary to its lines to all Germans considering the question of change of location. This pamphlet will be followed by other publications giving general information about this territory which it is thought will be the means of attracting the attention of thousands of Germans to the South.

These publications, besides having a general distribution, will also be sent in answer to all inquiries which are now being received daily from Germans all over the North and West and in Europe.

Too much stress cannot be laid upon the importance of the people of the South doing all they can to foster and promote this movement. Germans already located in the South can do much to promote this work. The Southern Railway will be glad to have from each German located along its line his individual opinion of the country in which he is located as a desirable field for this class of immigration. This information will be of special value in its negotiations with other Germans, and the result will be mutually beneficial. Undoubtedly there is abundant room in each county of the South for German farmers, and it is hoped the Southern Railway will receive the earnest and active co-operation of the people located along its lines. This will result in producing a tide of emigration to the South of active and energetic Germans, and will cause thousands of that class of people to seek homes in this Southern clime.

Mr. M. V. Richards, Washington, D. C., the Land and Industrial Agent of the Southern Railway Company, will be glad to hear from those interested in the subject. Write him and send him the names and addresses of your German friends and relatives in the North and Europe so that he can send them the literature referred to.

The Burt Manufacturing Co.

Among the orders recently filled by the Burt Manufacturing Co., Akron, Ohio, for their celebrated oil filters and exhaust heads are the following:

Tennessee Coal and Iron Railroad Co., fourth order; Cleveland Electric Illuminating Co., Cleveland, Ohio; American Sheet Steel Co., twenty-first order; Baldwin Locomotive Works, Philadelphia, Pa., thirteenth order; Utah Light and Power Co., Salt Lake City, Utah; American Steel and Wire Co., Worcester, Mass. We also note orders from Witten, Germany, Buenos Ayres, Argentine Republic, and London, England.

Catalogue of Mill Supplies.

J. Russell & Co., Holyoke, Mass., issue a remarkably complete catalogue of mill supplies which they carry in stock. The catalogue is fully illustrated and will be mailed post paid on request. It is a good thing for any textile mill office to have on file.

Mercerized Yarn.

J. E. Brown Cotton Works, of which J. E. Brown is manager, have a well equipped plant on Bigelow St., Holyoke, Mass., and are making a speciality of mercerizing skein yarns for the trade. Mr. Brown is a practical mercerizer, having studied that process carefully, going abroad and remaining some time in Germany for the express purpose of thoroughly acquainting himself with the best methods. His plant has now been in operation for nearly a year, and he is turning out first-class work. He claims to produce the highest silk lustre, with no shrinking in yardage or loss in weight.

Ventilating Fans Not Blowers.

For years it has been the endeavor of makers of exhaust fans of the disk type to educate the public to a knowledge of the value of such fans in removing dust, smoke, heat, steam, foul air, gases (and indeed anything obnoxious that floats in the air) from mills, factories and buildings. And while in a measure they have been successful, yet owing partially to hesitancy in accepting the statements of manufacturers, the misapplication of some fans, and more largely to the inefficiency of inferior makes, causing distrust in all, there are many owners and superintendents of factories, mills and buildings of every sort who suffer for the need of just this sort of ventilation.

To this class the Barney Ventilating Fan Works of Boston make the unusual offer of a trial of the Barney fan in proof of its efficiency under every conceivable condition; making, however, the condition that their engineers be allowed to decide size of fan necessary to do the work in any specific case.

They have a new circular in which the difference is explained between a blower and a disk fan, which may be had on application, and is of importance to manufacturers.

Recent Textile Patents.

BLEACHING YARN COPS. 739,751. John E. Bland and Edward J. Gilligan, Pawtucket, R. I., assignors of one-half to Edward W. McDuff and Frank J. McDuff, Fawtucket, R. I.

BOBBIN HOLDER. 737,050. Simon W. Wardwell, Providence, R. I., assignor to Universal Winding Co., Portland, Me.

BRAIDING MACHINE SPINDLE. 738,383. Louis W. Whitehead, Manchester, England.

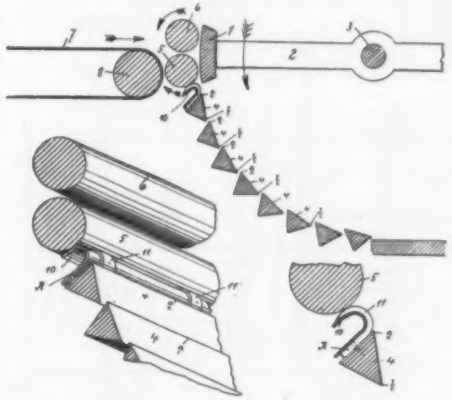
CLOTH CUTTER. 737,768. James T. Preston, Filley, Mo.

CLOTH TENTERING MACHINE. Stop Motion. 737,910. John L. Dabbs, Rockhill, S. C., assignor of one-half to John R. London, Rockhill, S. C.

COMBING MACHINE. Stop Motion. 737,268. Oscar L. Owen, Whitinsville, Mass., assignor to Whitin Machine Works, Inc., Whitinsville, Mass.

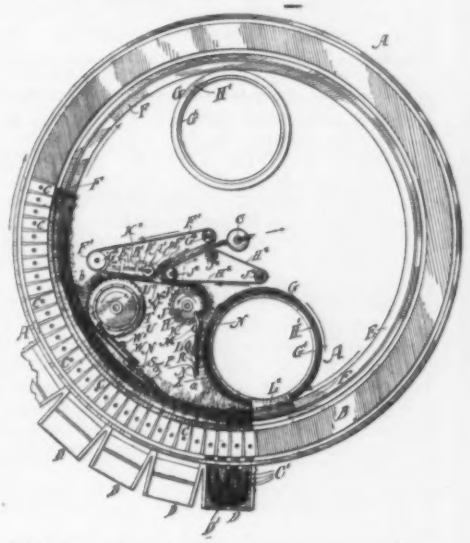
Cotton Opening and Cleaning Machine. 735,076. Richard E. Evans, New Hartford, N Y.

This invention provides an improvement in machines for opening and cleaning cotton or other fibrous material, which will reduce the amount of waste in such machines as heretofore constructed and at the same time not decrease the capacity or efficiency of the machine.



COTTON OPENING AND CLEANING MACHINE. 739,246. David J. Winn, Sumter, S. C.

COMBING MACHINE Drawing-Off Attachment. 730,021. Walter B. Jefferson, Philadelphia, Pa., assignor of one-half to Edward Jefferson and Mordecai Jefferson, Philadelphia, Pa.



This invention relates to improvements in drawing-off attachments for combing-machines, and consists of means whereby the endless aprons between which the long strands or "tops" pass are not subjected to the strain which they undergo at present, thereby prolonging the working qualities of the aprons and reducing to a minimum the necessity of replacing broken or worn-out aprons.

DRAWING FRAMES. Shipper Lock for 737,862. Henry A. and Oscar L. Owen, Whitinsville, Mass., assignors to Whitin Machine Works, Whitinsville, Mass.

DRAWING FRAMES. Shipper Lock for 737,863. Henry A. and Oscar L. Owen, Whitinsville,

Mass., assignors to Whitin Machine Works, Whitinsville, Mass.

FABRIC. 737,751. Amanda M. Lougee, Boston, Mass.

FABRIC PICKING TABLE. 737,990. Emil Zenger, Scranton, Pa.

FLAX BREAKING MACHINE. 738,893. George H. Ellis, Chicago, Ill., assignor to William Deering, Chicago, Ill.

FLAX STRAW PREPARING MACHINE. 738,783. George H. Ellis, Chicago, Ill., assignor to William Deering, Chicago, Ill.

KNITTING MACHINE. 739,708. Edward Parkinson, Philadelphia, Pa.

LOOM. 737,837. Charles A. Herald, Hamilton, Canada.

LOOM. 737,002. Benjamin F. McGuiness, Worcester, Mass., assignor to Crompton & Knowles Loom Works, Worcester, Mass.

LOOM. 739,651. Randolph Crompton, Worcester, Mass.

LOOM FOR BEADWORK. 737,073. Edwin J. Bush, New York, N. Y.

LOOM FOR CROSS WEAVING. 737,865. Isaac E. Palmer, Middletown, Conn.

LOOM Filling-Replenishing. 739,113. Orren A. Sawyer, Lowell, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM LET-OFF AND TAKE-UP MECHANISM. 737,938. William F. Kintzing, New Freedom, Pa.

LOOM PICKER MOTION. 739,526. Alfred H. Whatley, Providence, R. I., assignor to James Meers, Cumberland Hill, R. I., and George Reader, Providence, R. I.

LOOM PICKER STICK CHECK. 737,219. Eli H. Gleason, Putnam, Conn.

LOOM PILE WIRE RETAINER. 738,031. Harry Hardwick, Philadelphia, Pa.

LOOM SHED FORMING MECHANISM. 737,148 Charles F. Roper, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM SHED FORMING MECHANISM. 737,149 Charles F. Roper, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM SHUTTLE. 738,987. Bernard Crossley, Burnley, England.

LOOM SHUTTLE CHANGING MECHANISM. 737,526. Albert Walker, Arthur Walker and George Walker, Norwood Green, England.

LOOM SHUTTLE CHECKING MECHANISM. 738,255. Joseph E. Tichon, New Bedford, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM SHUTTLE DETECTING MEANS. 738,249. Isaac Snow, Lawrence, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM SHUTTLE LOCK. 739,018. Francis A. Mills, Lawrence, Mass., assignor of one-half to Grosvenor B. Emmons, Methuen, Mass.

LOOM SHUTTLE MOTION. 737,939. William F. Kintzing, New Freedom, Pa.

LOOM SWEEP STRAP. 737,266. Charles P. Nichols, Cranston, R. I.

LOOM TAKE-UP MECHANISM. 738,245. Orren A. Sawyer, Lowell, Mass., assignor to Draper Co., Hopedale, Mass.

LOOM WARP STOP MOTION. 737,544. James H. Wolger, Methuen, Mass., assignor of two-thirds to Samuel C. Foss and Charles E Collins, Methuen, Mass.

LOOM WEFT REPLENISHING and Controlling Mechanism. 739,573. William H. Baker, Central Falls, R. I, and Frederic E. Kip, Montclair, N. J.

LOOM WEFT REPLENISHING Mechanism. 738,644. Albert E. Arthur and George Walker, Norwood Green, England.

MANGLL. 738,448. Gottleib Horig, Lawrence, Mass.

MEASURING MECHANISM for Warpers. 737,405. Henry Hebert, Fall River, Mass., assignor to Draper Co., Hopedale, Mass.

MERCERIZING APPARATUS. 739,580. Robin Boral and Alfred Kymer, Middleton, England, assignors to the Windsor Company, N. Y.

MERCERIZING APPARATUS. 734,333. Paul Jeanmaire, Mulhause, Germany.

PILE FABRIC. Woven. 731,433. Richard S. Cookson and Henry Cookson, Philadelphia, Pa.

PRINTING APPARATUS. Yarn. 732,001. Charles L. Horack, New York City, assignor to Fabric Coloring Company, New York City.

SPINNING FRAME TOP ROLL. 739,014. John J. Weiss, Worcester, Mass., assignor to himself and Louis F. Weiss, Worcester, Mass.

SPINNING FRAMES. Automatic Thread Board Lifter. 737,084. Narcisse N. S. Daudelin, Fall River, Mass.

SPINNING FRAMES, Shipper Lock for. 737,864. Henry A. and Oscar L. Owen, Whitinsville, Mass., assignors to Whitin Machine Works, Whitinsville, Mass.

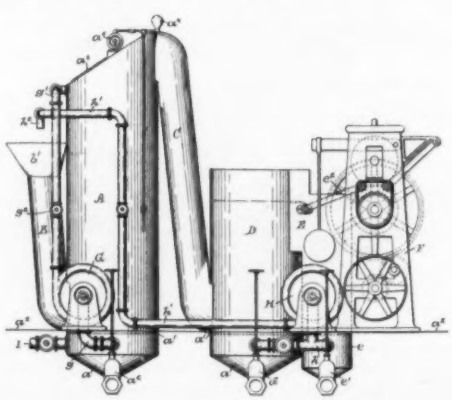
SPINNING RING. 739,739. Michael E. Sullivan, New Bedford, Mass., assignor to the Draper Co., Hopedale, Mass.

WOVEN FABRIC. 738,218. Harry J. Mackintosh and Robert R. Tweed, Audubon, N. J.

YARN, Manufacturing Cotton. 738,040. Henry W. Kearns, Accrington, Eng.

Wool Washing Machine. 735,359. Harry S. Frank, Providence, R. I.

This invention has reference to an improvement in machines for washing wool. It consists of a peculiar and novel arrangement and combination whereby the wool is subjected to the washing process in vertical tarks and the washing liquor is circulated through the floating wool.



C. E. RILEY & CO.

65 Franklin Street, BOSTON, MASS.

BUILDERS AND IMPORTERS OF

COTTON WOOLEN WORSTED

MACHINERY

AGENTS FOR

HOWARD & BULLOUGH, Ltd., Picking, Revolving Flat Cards, Electric and Mechanical Stop Motion Drawing, Slubbing, Intermediate, Roving and Jack Frames, Spinning and Twisting, New Patent Self-Acting Mules, Spoolers, Warpers and Slashers,

RICHARD THRELFALL, Patent Fine Spinning Mules, 100s to 350s.

HALL & STELLS, Worsted Machinery.

CONSTRUCTION DE MACHINES, Ci-Devant, F. J. Grun. French Worsted Machinery.

HOYLE & PRESTON, Noble Combs, Back Washing Machines, etc.

JAMES TOMLINSON, Ltd., Cotton Waste Machinery; Engine Cleaning and Hard Waste Breaking Machines, etc.

JOHN HAIGH & SONS, Ltd., Woolen and Worsted Cards, Fearnoughts, Feeds, etc,

THOS. BROADBENT & SONS, Hydro Extractors, Patent Suspended Steam and Electrical Driven, Machines kept in stock in Boston.

JOHN WHITELEY & SONS, Card Clothing for Cotton; Tempered Steel, Plough Ground, Needle Pointed.

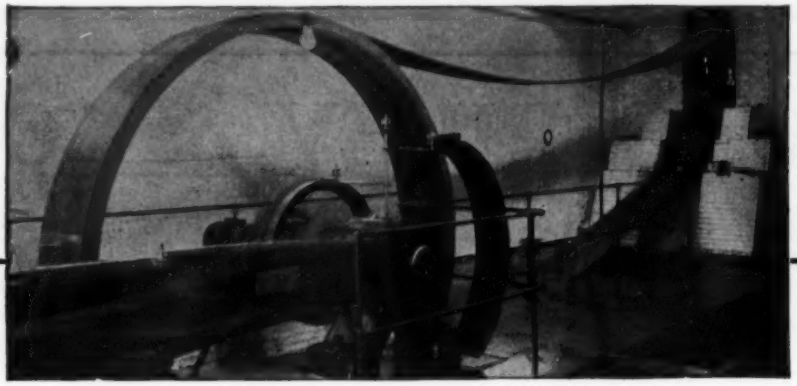
L. M. TETLOW & SONS, Card Clothing for Woolen and Worsted; Tempered Steel, Needle Pointed.

J. GREENHALGH & SONS, Cotton Waste Willows, for Fly, Strips, Picker Droppings, etc.

DRONSFIELD BROS., Ltd., Grinding Rolls and Emery Filleting. Stock kept in Boston.

SPINDLES, FLYERS, FLUTED ROLLS, ETC.

DIRECT .. .. IMPORTERS OF **EGYPTIAN COTTON**



Mate Cling-Surface With Oil

You can reduce your friction load considerably by using proper oils but you can do as much again by using Cling-Surface also.

Every tight belt means enormous friction on bearings. It is tight to prevent slipping. Stop slip with Cling-Surface and you need no tight belts. It's a simpler matter than oil and as important.

This belt is in the Valley Woolen Mill, Cherry Valley, Mass. What's the friction load? Pretty low, yet the belt pulls the whole mill.

CLING-SURFACE MFG CO 199-205 Virginia St Buffalo N Y

BOSTON 170 Summer St NEW YORK 39 Cortlandt St PHILADELPHIA The Bourse

The LUNKENHEIMER

Suitable for all movable bearings, is simple and practical in construction and can be filled without detaching plug. Glass sides show stage of oil. Attach cup so that the glass sides are parallel with the rod. When cup is in motion the oil begins to travel in a body within the cup, and at each revolution is thrown against the feed tube and flows down through it to the bearing. The centrifugal force, combined with the shape of the body, carries the oil to the holes in the feed tube. A trial solicited and satisfaction guaranteed. Write for catalogue of superior brass and iron steam specialties. Specify "*Lunkenheimer*" make and order from your dealer.

The Lunkenheimer Co.
Sole Makers and Patentees,
CINCINNATI, OHIO, U. S. A.

BRANCHES:
NEW YORK: 26 Cortlandt Street.
LONDON: 85 Great Dover Street.

"CHAMPION" ROD OIL CUP

Buyers' Index.

The addresses of builders of mill machinery and dealers in mill supplies, whose names appear in the following classified index, may be found upon referring to their advertisement. The Alphabetical Index to advertisers follows this classified list. Buyers who are unable to find in these classified lists such machinery or supplies as they desire, are invited to communicate with the publishers, who can, in all probability, refer them to proper sources.

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

Accident Cabinets.
Putnam & Co.

Air Moistening System.
American Moistening Co.

Appraisers.
American Appraisal Co.

Architects and Mill Engineers.
Ballinger & Perrott.
Ferguson, John W.
Gray, Arthur P.
Moulton, H. L.
Patterson, H. C.
Stearns & Castor.
Suck, Adolph.

Asphalt and Concrete.
Warren Bros. Co.

Automatic Feeds for Cards.
Schofield, Wm. Co.

Automatic Feeds for Cotton and Wool.
American Drying Machinery Co.
Harwood, Geo. S. & Son.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Smith, Jas., Woolen Machinery Co.
Woonsocket Machine & Press Co.

Automatic Shuttle and Loom Attachments.
Asala Co.
Stafford, G. W. Mfg. Co.

Automatic Sprinklers.
International Sprinkler Co.

Balling Machine.
Torrance Mfg. Co.

Bandings.
——See under Yarns.

Baskets.
Ballou Basket Works.
Lane, W. T. & Bro.
Morris & Co.

Belting.
Boston Belting Co.
Dodge Mfg. Co.
Jeffrey Manufacturing Co.
Keystone Leather Belting Works.
Main Belting Co.
Popham, Henry, & Son.
Shultz Belting Co.
Smith, Jas. Woolen Mach. Co.
——See also Mill Supplies.

Belt Cutters.
Luther, C. A. & Co.

Belt Dressing.
Cling Surface Mfg. Co.
Dixon, Jas. Crucible Co.
Keystone Leather Belting Works.
Stephenson Mfg. Co.

Belt Lacing Machines.
Diamond Drill & Machinery Co.

Bindings.
——See Tapes and Braids.

Bleaching Kiers.
Allen, Wm. & Sons Co.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Works).

Bleaching Materials.
Bosson & Lane.
Roessler & Hasslacher Chemical Co.

Block Cutting for Printing.
Atlas Copper Stamp Works.

Blowers and Blower Systems.
American Blower Co.
Barney Ventilating Fan Works.
Boston Blower Co.
Buffalo Forge Co.
Hartford Blower Co.
Mass. Fan Co.
Sturtevant, B. F. Co.

Bobbins, Spools, Shuttles, Etc.
Murray, Chas. O.
New England Shuttle Co.
Sweet & Doyle.
Tebbets, E. L. & Co.

Boilers.
——See Steam Boilers.

Boxes, Cloth Boards, Etc.
Pearson, J. T.

Boxes (Paper).
——See Paper Boxes.

Braiding Machinery.
New England Butt Co.
Textile Machine Works.

Braids.
——See Tapes, Braids and Edgings.

Brass (Perforated).
——See under Perforated Metal.

Brokers.
Shoemaker, M. France.

Brushes.
Felton, S. A. & Son Co.
Mason Brush Works.

Brushers.
——See Napping Machines.

Burr Pickers.
Curtis & Marble Machine Co.
Sargent's, C. G., Sons.
Smith, Jas., Woolen Machinery Co.

Burlaps.
Stoddard, Haserick, Richards & Co.

Calico Printers' Machinery and Supplies.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Works).
Butterworth, H. W. & Sons Co.
Taunton, New Bedford, Copper Co.
Textile Finishing Mchry. Co.
——See also Dyeing, Bleaching, Machinery, etc.

Canvas Baskets.
Ballou Basket Works.
Lane, W. T. & Bro.
Morris & Co.

Carbonizing.
Riverdale Woolen Co.

Carbonizing Machinery.
American Drying Machinery Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Sargent's, C. G., Sons.
Smith, Jas. Woolen Machinery Co.

Card Clothing.
Ashworth, Elijah.
Edma Card Clothing Co.
Leigh, Evan A.
Riley, C. E. & Co.
Smith, Jas., Woolen Machinery Co.
Stoddard, Haserick, Richards & Co.

Card Feeds.
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Card Grinding Machinery.
Entwistle, T. C., Co.
Philadelphia Textile Machinery Co.
Riley, C. E. & Co.
Smith, Jas. Woolen Machinery Co.
Stoddard, Haserick, Richards & Co.

Carders' Tools.
Brown, W. H.

Carpet Machinery.
Altemus, Jacob K.
Curtis & Marble Machine Co.
Howard Foundry & Mch. Wks.
Philadelphia Textile Machinery Co.
Smith, Jas., Woolen Machinery Co.

Castings.
Livermore, Homer F.
Schofield, Wm. Co.

Chemicals and Apparatus.
Fiedt, Geo. D. & Co.
Roessler & Hasslacher Chemical Co.

Cling Surface.
Cling Surface Mfg. Co.

Clocks.
Howard, E., Clock Co.
Riggs & Brothers.

Cloth Boards.
Chaffee Bros.

Cloth Stretchers.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Works).
Luther, C. A. & Co.

Clutches.
American Tool & Machine Co.
Dodge Mfg. Co.
Hunter, James, Machine Co.
Smith, Jas. Woolen Machinery Co.
Smith, F. L.
Speed Changing Pulley Co.

Coal.
Big Brushy Coal & Coke Co.

Combs (Wool and Cotton).
Crabb, William & Co.
Hood, R. H.
Philadelphia Textile Machinery Co.
Riley, C. E. & Co.
Smith, Jas., Woolen Machinery Co.
Stoddard, Haserick, Richards & Co.
Townsend, Thomas.

Commission Agents.
English-Greene Co.

Conveying Machinery and Chains.
Jeffrey Manufacturing Co.

Cop Tubes.
——See Paper Tubes.

Copper (Perforated).
——See under Perforated Metal.

Copper Print Rollers.
Taunton, New Bedford Copper Co.

Coppersmiths.
Boer, Paul.
Badger, E. B. & Sons Co.

Copper Work for Dyers.
Butterworth, H. W. & Sons Co.
Textile Finishing Machinery Co.

Cotton.
Blaisdell, Jr., Co., S.
Charles, W. B.
Riley, C. E. & Co.
Stoddard, Haserick, Richards Co.

Cotton Elevators.
Buffalo Forge Co.

Cotton Machinery.
Altemus, Jacob K.
Atherton, A. T., Machine Co.
American Drying Machinery Co.
Ashworth, Elijah.
Barker, James.
Brigham, Arthur A.
Brownell, G. L.
Butterworth, H. W. & Sons Co.
Crompton & Knowles Loom Works.
Curtis & Marble Machine Co.
Draper Company.
Easton-Burnham Co.
Elliott & Hall.
Entwistle, T. C., Co.
Fairmount Machine Co.
Firth, William, Co.
Houghton, L. T.
Howard & Bullough American Mach. Co.
Kilburn, Lincoln & Co.
Kitson Machine Co.
Leigh, Evan A.
Lever, Oswald.
Lowe, Stephen C.
Lowell Machine Shop.
Mason Machine Works.
Metallic Drawing Roll Co., The.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Riley, C. E. & Co.
Saco & Pettee Machine Shops.
Schofield, Geo. L.
Smith, Jas., Woolen Machinery Co.
Speed & Stephenson.
Stoddard, Haserick, Richards & Co.
Whitin Machine Works.
Woonsocket Machine & Press Co.

Cotton Openers and Lappers.
Atherton, A. T., Machine Co.
Howard & Bullough American Mach. Co.
Kitson Machine Co.
Riley, C. E. & Co.
Stoddard, Haserick, Richards & Co.

Cotton Softeners.
Bosson & Lane.
Loos & Dilworth.

Cotton Waste.
Becker, C. W.
Blaisdell, Jr., Co., S.
Charles, W. B.

Crayons.
Lowell Crayon Co.

Cutters for Knit Fabrics.
Adams Rib & Top Cutting Co.
Kennedy, Thos. (Cutters, etc.).
Universal Cutter Co.

Dating and Time Stamps.
Riggs & Brothers.

Dextrine.
Stein, Hirsh & Co.

Dobbies.
Crompton & Knowles Loom Works.
Stafford, George W. Co., The.

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Drawing Rolls.
Hood, R. H.
Metallic Drawing Roll Co., The.

Dryers.
American Blower Co.
American Drying Machinery Co.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch, Arthur, Arlington Machine Works.
Birch Bros. Co. (Somerville Mchn. Works).
Boston Blower Co.
Buffalo Forge Co.
Butterworth, H. W. & Sons Co.
Hartford Blower Co.
Hunter, Jas., Machine Co.
Kenyon, D. R. & Son.
Mass. Fan Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Sargent's, C. G., Sons.
Smith, Jas., Woolen Machinery Co.
Somerville Mach. Wks.
Sturtevant, B. F. Co.
Textile Finishing Machinery Co.

Drying Boards.
Bull, William C.

Dusters.
—See Wool and Waste Dusters.

Dust Collectors.
Allington & Curtis Mfg. Co.
Hartford Blower Co.
Philadelphia Drying Machinery Co.

Dyers, Bleachers and Finishers.
Bilisville Mills.
Brophy's, T., Sons.
Cold Spring Dyeing & Bleaching Co.
Cooper Mercerizing Co.
Cranston Worsted Mills (yarns).
Davidson, J. F.
Firth & Foster Co.
Greenwood, R. & Bault.
Home Bleach & Dye Works.
Ingrahamville Dye Works.
Keystone Fast Black Dye Works.
Lorimers, The Wm. H. & Sons Co.
Molt Bros. (Indigo Blue).
Pawtucket Dyeing & Bleaching Co.
Pennypack Yarn Finishing Co.
Providence Mills Mfg. Co.
Rothe, O. & P., Man. & Supply Co., Ltd.
Rowland, Samuel.
Whittier Mills.
Wild, Chas. E.

Dyeing, Drying, Bleaching and Finishing Machinery.
American Blower Co.
American Drying Machinery Co.
American Yarn Dyeing Machine Co.
Antisdel, E. M. (Knit Dryer).
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch, Arthur, Arlington Machine Works.
Birch Bros. Co. (Somerville Mchn. Works).
Buffalo Forge Co.
Butterworth, H. W. & Sons Co.
Curtis & Marble Machine Co.
Dubois, A. N.
Empire Laundry Machinery Co.
Entwistle, T. C., Co.
Fabric Measuring & Packaging Co.
Fairmount Machine Co.
Gessner, David.
Haag, A. W., & Co.
Hartford Blower Co.
Heathcote, John & Son.
Hopkins Machine Works.
Howard Foundry & Mch. Wks.
Kenyon, D. R. & Son.
Klauder-Weldon Dyeing Machine Co.
Leyland, Thos. & Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Smith, Drum & Co.
Smith, Jas., Woolen Machinery Co.
Somerville Machine W'ks, Birch Bros. Co.
Sturtevant, B. F. Co. (Drying).
Textile Finishing Machinery Co.

Dye House Cans.
Hill, James, Mfg. Co.

Dye Sticks.
Bailey, Frank.
Haedrich, E. M.

Dyestuffs and Chemicals.
Atteaux, F. E. & Co.
Berlin Aniline Works.
Bischoff & Co.
Bosson & Lane.
Cassella Color Co.
Dillon & Co.
Dubois, A. N.
Farbenfabriken of Elberfeld Co.
Ford, J. B., Co.
Fortner, L. B.
Geigy Aniline & Extract Co.
Geisenheimer & Co.
Holliday & Sons, Ltd.
Johnson, Chas. A. & Co.
Kuttroff, Pickhardt & Co.
Leyland, Thos. & Co.
Metz, H. A. & Co.
Molt Bros. (Indigo Blue).
N. Y. & Boston Dyewood Co.
Roessler & Hasslacher Chemical Co.
Selling Co., The.
Sharpless Dye Wood Ext. Co.
Solvay Process Co.
Sykes & Street.
Thayer, Ed. M.
Vila, H. S.
Wild, Charles E.

Dynamos and Motors.
General Electric Co.
Sturtevant Co., B. F.

Edgings.
—See Tapes, Braids and Edgings.

Electrical Construction.
General Electric Co.

Electric Fans.
American Blower Co.
Buffalo Forge Co.
General Electric Co.
Hartford Blower Co.
Mass. Fan Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
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Electric Lighting.
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Electric Motors.
General Electric Co.
Sturtevant Co., B. F.

Electrotyping and Printing.
Whitcomb, H. C. & Co.

Elevators.
Howard Foundry & Mch. Wks.
Jeffrey Manufacturing Co.
Morse, Williams & Co.
Salem Elevator Works.

Employers Time Recorders.
Riggs & Brothers.

Exhaust Heads.
Burt Manufacturing Co.
Hartford Blower Co.
Pittsburg Gage & Supply Co.
Sturtevant, B. F., Co.

Fans—Exhaust and Ventilating.
—See Ventilating Apparatus.

Feed Water Heaters.
Green Fuel Economizer Co.
Scaife, W. B. & Sons.

Feed Water Pumps.
Goulds Mfg. Co.
Pittsburgh Gage & Supply Co.
Scaife, W. B. & Sons.

Feeds.
—See Automatic Feeds.

Filters.
Norwood Engineering Co.
Phila. Water Purification Co., The.
Pittsburgh Gage & Supply Co.
Scaife, W. B. & Sons.

Finishing Machinery.
—See Dyeing, Drying, Bleaching and Finishing.

Fire Brick.
Borgner, Cyrus, Co.

Fire Extinguishers.
Badger, E. B. & Sons Co.

Fire Hose.
Boston Belting Co.

Fire Hydrants.
Norwood Engineering Co.

Fire Proof Doors and Windows.
Lupton's, David, Sons Co.

Flax, Tow, Hemp and Jute Machinery.
Lawson, Samuel & Sons.

Fluted Rolls.
Baker Machine Co.
Hood, R. H.
Riley, C. E. & Co.
Thurston, A. G. & Son.

Flyers.
Baker Machine Co.
Textile Machinery Co.

Forges.
Buffalo Forge Co.
Sturtevant Co., B. F.

Friction Clutches.
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Friction Cones.
Evans, G. Frank.

Fuel Economizers.
Green Fuel Economizer Co.

Fulling Mills for Woolen Goods.
Hopkins Machine Works.
Hunt, Rodney, Machine Co.
Hunter, Jas., Machine Co.
Kenyon, D. R. & Son.

Garnetts.
Philadelphia Textile Machinery Co.
Smith, Jas., Woolen Machinery Co.

Gas Engines.
Jones, Lewis.

Gas Exhausters.
Hartford Blower Co.
Sturtevant Co., B. F.

Gaskets (Rubber).
Boston Belting Co.

Gauges.
Crosby Steam Gage & Valve Co.
Lunkenheimer Co.
Pittsburgh Gage & Supply Co.

Gears.
New Process Raw Hide Co.

Gear Cutting Machine.
Whiton, The D. E., Co.

Generating Sets.
Buffalo Forge Co.
Sturtevant Co., B. F.

Heating.
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Heddles.
Smith, Jas., Woolen Machinery Co.
Stoddard, Haserick, Richards & Co.
Watson, L. S., Mfg. Co.

Hose.
Boston Belting Co.

Hosiery Boards.
Pearson, J. T.

Hosiery Labels.
Saranac Electrical Mfg. Co.

Hosiery (Winders).
Brigham, Arthur A.

Humidifying Apparatus.
American Air Moistening Co.

Hydro Extractors.
American Tool & Machine Co.
Brigham, Arthur A.
Empire Laundry Machinery Co.
Riley, C. E. & Co.
Stoddard, Haserick, Richards & Co.
Textile Finishing Machinery Co.

Injectors.
Lunkenheimer Co.

Interior Telephone System.
Allen-Hussey Co.

Ironing Machines for Knit Goods.
Craw, J. W., Laundry Machinery Co.
Empire Laundry Machinery Co.

Jacquard Cards.
Rogers Paper Mfg. Co.

Jacquards.
Halton's, Thomas, Sons.

Knit Goods, Edgings, Trimmings, Etc.
Cathcart, John & Co.
Chapin, Geo. W.
Charles, W. B.
Cheney Bros.
Friedberger Mfg. Co.
Hepner & Horwitz.
Krout & Fite Mfg. Co.
Weimar Bros.

Knit Goods Finishing Machines, Crochet, Etc.
Craw, J. W., Laundry Machinery Co.
Fink, John.
Johnson Novelty & Mill Supply Co.
Merrow Machine Co., The.
Nye & Tredick Co.
Scott & Williams.
Union Special Sewing Machine Co.
Willcox & Gibbs Sewing Machine Co.

Knitting Machine Cylinders.
Paxton & O'Neill.
Ruth Automatic Knitting Machine Co.
Stafford & Holt.
Stanton & Lewis.

Knitting Machinery.
Adams Rib and Top Cutting Mch. Co.
American Knitting Machine Co.
Branson Machine Co.
Brinton, H. & Co.
Champion Machine Co.
Claes & Flentje.
Cooper, Chas.
Crane Mfg. Co.
Excelsior Knitting Machine Mfg. Co.
Hemphill Machine Co.
Hess, J. Calvin.
Jenckes, E., Mfg. Co.
Jones, Lewis.
Kennedy, Thos. (Cutters, etc.).

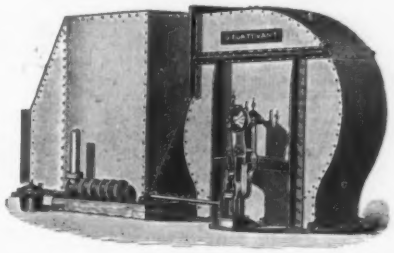
Alphabetical Advertising Index, with page numbers, follows this list.

THE WARM AIR

DISCHARGED BY A

STURTEVANT HOT BLAST APPARATUS

QUICKLY ABSORBS and renders invisible all moisture in the atmosphere of a bleachery or dye house.



IT ABSOLUTELY PREVENTS the formation of steam, keeps the atmosphere clear and increases the output of operatives. The excess of air pressure causes all leakage to be outward.

B. F. STURTEVANT CO.

BOSTON, MASS.

New York Chicago Philadelphia London

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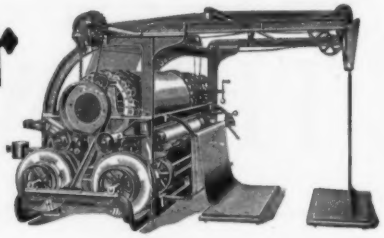
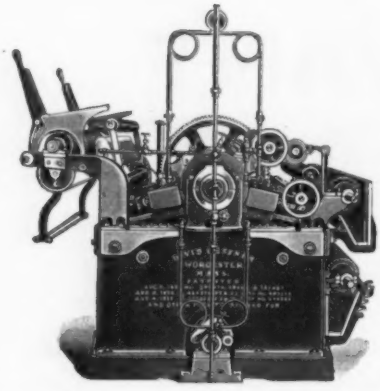
David Gessner

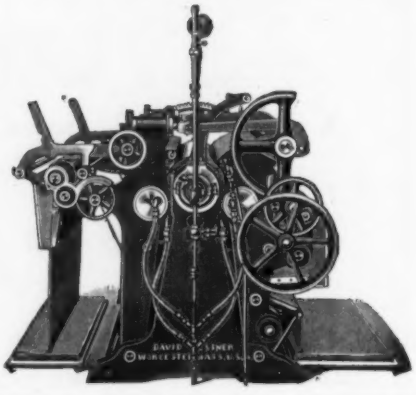
Worcester, Mass.





Latest Improved Cloth Finishing Machinery

Napping Machines and Presses a Specialty



Knitting Machinery—cont.
Keystone Knitting Machine Mfg. Co.
Lamb Knitting Mach. Mfg. Co.
Leighton Machine Co.
Lindley, Geo. W.
Ludwig, E. H.
Mayo Knitting Machine & Needle Co.
McMichael, A.
McMichael & Wildman Mfg. Co.
Mueller, Arthur.
National Automatic Knitter Co.
Nye & Tredick Co.
Paxton & O'Neill.
Pepper Machine Works.
Richter, Wolfgang.
Ruth Automatic Knitting Machine Co.
Scott & Williams.
Seyfert & Donner.
Stafford & Holt.
Standard Machine Co.
Taylor, James.
Tompkins Bros.
Walther, Otto.

Knitting Needles and Supplies.
Breedon's, Wm., Son.
Brinton, H. & Co.
Cooper, Chas.
Corey, Wm., Co.
Crane Mfg. Co.
Dodge Needle Co.
Freeman Bros.
Ives, Loyal T.
Keystone Knitting Machine Mfg. Co.
Lamb Knitting Machine Mfg. Co.
Manufacturers' Supplies Co.
Mayo Knitting Machine & Needle Co.
Page Needle Co.
Ruth Automatic Knitting Machine Co.
Treat, Orion.
Wardwell Needle Co.

Labeling Machine.
Saranac Electrical Mfg. Co.

Laboratory Outfits.
Feidt, Geo. D. & Co.

Leather.
Houghton, E. F. & Co.

Leather Boards.
Rogers Paper Mfg. Co., Inc.

Lockers.
Narragansett Machine Co

Loom Forks.
Clegg Weft Fork Co.
Non-Rebounding Loom Fork Co.

Looms.
Asahi Co.
Crompton & Knowles Loom Works.
Draper Company.
Fairmount Machine Works.
Howard Fndy. & Mch. Wks. (For Wire).
Kilburn, Lincoln & Co.
Leigh, Evan A.
Lowell Machine Shop.
Mason Machine Works.
Smith, Jas., Woolen Machinery Co.
Stafford, George W. Co., The.
Stoddard, Haserick, Richards & Co.
Whitin Machine Works.

Loopers.
Beattie's Machine Works.
Hepworth, John W. & Co.
Leighton Machine Co.

Lubricators.
Dixon, Jos., Crucible Co.
Lunkenheimer Co.
Pittsburgh Gage & Supply Co.

Lumber.
Stearns, A. T., Lumber Co.

Lumpers.
Gerry, George & Son.
Schofield, Wm. Co.

Machinery Dealers.
American Textile Supply Co.
Jefferson, Ed. & Bro.
Pittsburgh Gage & Supply Co.
Schofield, Geo. L.
Taylor, James.

Machinists' Tools.
Dodge Mfg. Co.
Whiton, The D. E. Co.

Mails.
Walder, J.

Measuring and Folding Machines.
Curtis & Marble Machine Co.
Elliott & Hall.
Fabric Measuring & Packaging Co.

Mechanical Draft.
American Blower Co.
Boston Blower Co.
Buffalo Forge Co.
Mass. Fan Co.
Sturtevant, B. F., Co.

Mechanical Engineers.
American Blower Co.
Buffalo Forge Co.
Hartford Blower Co.
Sturtevant Co., B. F.
Suck, Adolph.

Mercantile Agency.
Dun, R. G. & Co.

Mercerizers.
Bliss ville Mills.
Brown, J. E. Cotton Wks.
Cooper Mercerizing Co.

Mercerizing Machinery.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros. Co. (Somerville Mchn. Works).
Butterworth, H. W. & Sons.
Klauder-Weldon Dyeing Machine Co.
Smith, Drum & Co.
Textile Finishing Machinery Co.

Mill Architects.
See Architects & Mill Engineers.

Mill Brushes.
See Brushes.

Mill Builders and Engineers.
Ferguson, John W.

Mill Sewing Machines.
—See Sewing Machines and Supplies.

Mill Supplies.
American Supply Co.
American Textile Supply Co.
Bamford & Smith.
Barker, James.
Brigham, Arthur A.
Bristol, The, Co.
Buckley's, Benj. Son, Gun Mill.
Crosby Steam Gage and Valve Co.
Dixon Lubricating Saddle Co.
Dodge Mfg. Co.
Easton-Burnham Co.
Hartford Blower Co.
Jefferson, Ed. & Bro.
Jeffrey Manufacturing Co.
Johnson Novelty & Mill Supply Co.

Alphabetical Advertising Index, with page numbers, follows this list.

RUBEROID ROOFING

(Trade Mark Registered.)

STANDARD FOR TWELVE YEARS.

The only prepared Roofing for mills, factories, foundries, etc., which has proved its ability to resist the severest conditions. Proof against water, acids, heat, alkalies, gases, fumes, etc. Fire-resisting. Practically indestructible. Outlasts tin and iron. Send for samples and Booklet I.

THE STANDARD PAINT COMPANY,

104 WILLIAM STREET, NEW YORK.

Mill Supplies—cont.
Keystone Leather Belting Works.
Lane, W. T. & Bro.
Main Belting Co.
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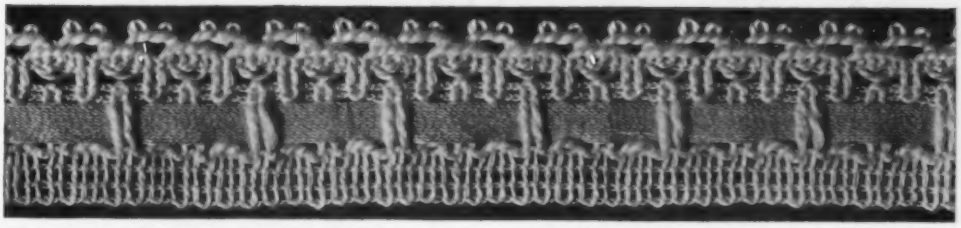

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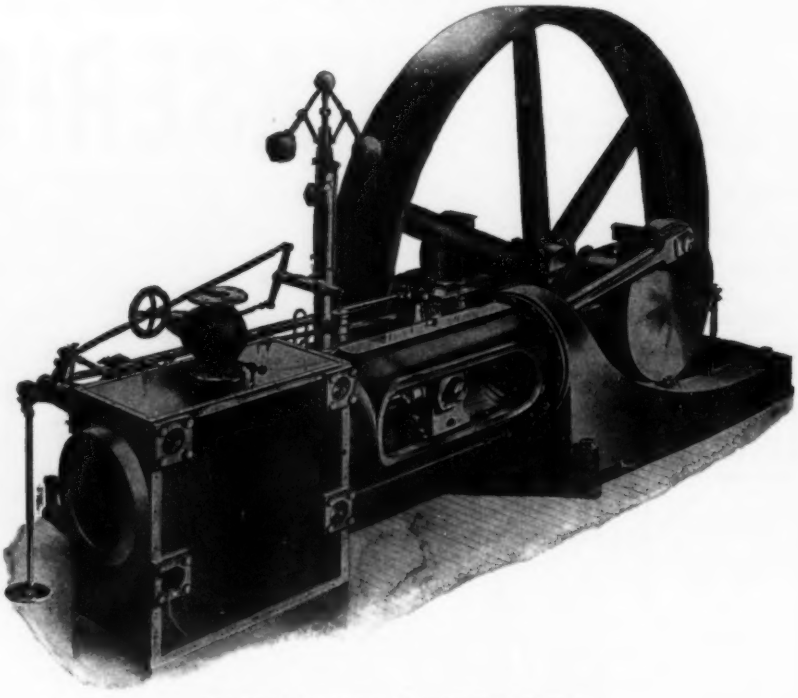

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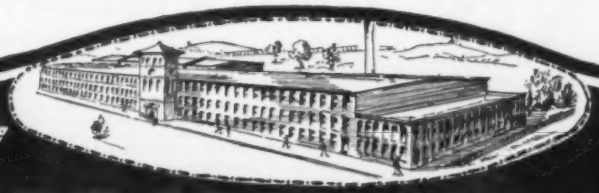

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Same rates as Wants, For Sale, etc. Manufacturers will be furnished, without charge, with the names of suitable men who are entered on our list, and can usually supply their wants in this way.

Dyer and Bleacher Wanted. A1 cotton raw stock and skein yarn dyer and bleacher. None but experienced men need apply, stating references. Address Raw Stock, Textile World Record, Boston.

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We wish to make a commission arrangement with a number of salesmen in different parts of the country who visit textile mills, to take our line as a supplement. No samples to carry. Goods well known and first-class in every respect. Address, "R. E. G.," care of Textile World Record, Boston.

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Foreign Latch Needle Manufactory of highest capacity, both for quality and prices, wants solvent agent, well up to the trade, for the United States and Canada. Address, "Needle," care of Textile World Record, Boston.

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Now covering mill trade in New England States, solicits interview with manufacturers desiring a representative for above mentioned territory. Address "X Y Z," care Textile World Record, Boston.

COTTON CARDER.

Situation wanted by a Cotton Carder. Experienced on American and English machinery. Good references. At present employed. Age thirty-six. Address, "Carder," care of Textile World Record, Boston.

Position Wanted as Assistant Superintendent or Boss Fixer. Have had practical experience as designer, tying up and fixing. Experienced in starting looms. Jacquard work preferred. Address "E. H.," Textile World Record, Philadelphia.

Foreman Presser wants engagement with firm of dyers. Practical experience in all classes of goods, Italians, linings, moreens, dress goods, cotton Italians. Famous permanent finish in Italians and alpaca linings. Knowledge of crabbing, singeing, etc. English and Continental experience. Highest references. Woodhead, Salisbury Terrace, Halifax, England.

BLEACHER AND DYER.

Position wanted by an experienced bleacher and dyer of cotton, wool and mixed, in skein, piece or knit goods, wool bleached with peroxide of sodium; married; terms moderate. "Peroxide," care Textile World Record, Boston.

SITUATIONS WANTED.

COTTON SUPERINTENDENTS.

Superintendent of cotton mill, a thoroughly capable man, is open to a position. Well up on English and American makes of machinery. Has manufactured yarns both in American and Egyptian cottons, from 17's to 70's. About 40 years of age; Scotch. Has held a responsible position in a New England company for the past 10 years. 1532, Textile World Record.

Superintendent Cotton Mill open to a position. Age 33; American; married. Good experience as overseer of carding in large mills. Combed and carded hosiery yarns, shirtings, sheetings, cheviots, madras. First-class references. 2096, Textile World Record.

Superintendent. Worked on ginghams and cotton warps of all kinds. Lowell, Whitin and Draper machinery. Age 41; American. Good experience. 2095, Textile World Record.

Superintendent and Designer. Has had 18 years' experience in weaving room, 12 years being in charge of rooms in some of the best mills in New England on fine yarns and fancies and designing. Qualified for superintendent's place. 2098, Textile World Record.

Cotton Mill Superintendent, or assistant. Age 34; married. Worked on cotton machinery on coarse and medium numbers. Textile school education in designing, carding and spinning. 3003, Textile World Record.

Superintendent Cotton Mill, or would take an overseer's position in large mill North for the present. Has been assistant superintendent for past year, previous to which he was overseer of carding for nine years, and before that was overseer of carding and spinning in the South. First-class references. Can take position at once. Colored and white goods. English and American machinery. 1853, Textile World Record.

Superintendent. Would like position in South. Not particular about salary to start. Machinist and thoroughly acquainted with all kinds of card room machinery, also spinning frames. Taken superintendent course in textile school and has had 23 years of practical experience in the mill, mostly on fine yarn work. 3044, Textile World Record.

Cotton Mill Superintendent. Age 38; Scotch; married. All counts of American and Egyptian cotton from 10 to 60, twist and weft, warps, beams, and bundles and crape yarns, super quality. Familiar with Platt, Asa Lee, Howard & Bullough, Hetherington and Brooks & Doxey machinery. First-class references. 3042, Textile World Record.

Situation Wanted by a practical man as working superintendent in a flax, tow, hemp or jute factory, making all kinds of yarn, threads, twines, etc. Best of references. 533, Textile World Record.

Superintendent, or overseer of carding. Worked on combed and carded yarn from 20 up to 140, twilled sateens, lawns, sheetings and shirtings. English and American machinery. 3036, Textile World Record.

First-Class Dyer

A good man with fifteen years' experience, desires position as dyer of cotton yarns, hosiery or raw stock. Will go anywhere for suitable position. Good recommendations from previous employers.

Address, Experienced, care Textile World Record

WOOLEN SUPERINTENDENTS.

Superintendent of large experience in the manufacture of woolen and worsted fancies and suitings, is open to an engagement as superintendent or designer. Age 45; American; married. Good references. 1982, Textile World Record.

Superintendent or designer. Age 35; American; unmarried. Satinets, unions, fancy cassimeres, kerseys, worsteds. Good experience and references. 3058, Textile World Record.

Woolen Mill Manager, formerly of Yorkshire, is open to take a similar position in the United States or Canada. 1976, Textile World Record.

Agent, or superintendent, or superintendent and designer. Good manager of help and a hustler. Thoroughly understands manufacture of shoddy in all its branches, including carbonizing and extracting. Familiar with all manipulations of wool, shoddy and cotton. Fully competent to take agent's position, as is a good wool buyer, and can figure all prices on goods and percentages, etc. 2053, Textile World Record.

Manager or Superintendent of a woolen mill, who understands designing, is open to an engagement. 34 years old; Scotch, and single. Large experience in Scotch and Canadian mills on tweeds, worsteds, overcoatings, etc. Good references. 1890, Textile World Record.

Superintendent or Designer, an American, married, 38 years of age, is desirous of obtaining a position. Understands the manufacture of worsteds, cotton worsteds, cassimeres, meltons—steam face, flannels, and horse and bed blankets. Long experience and up-to-date in methods. Moderate wage. 1936, Textile World Record.

Superintendent. American; married. Worked on cassimeres, dress goods, cotton warps, and has had some experience on worsteds. Will go anywhere, but would like a good Western mill. Good experience. 3034, Textile World Record.

Superintendent woolen mill. Age 47; English; married. Wants New England or Middle States. 10 years' experience in first-class N. E. mills. 2028, Textile World Record.

Superintendent of Woolen or Worsted Mill, who understands designing, is open to a position. 23 years of age; an American; single. Well recommended, and with good experience. 1891, Textile World Record.

Woolen Superintendent. Worked on nearly all kinds of men's wear and dress goods. Good experience as overseer and superintendent. Aged 51; American; married. 813, Textile World Record.

Manager and Buyer. Blankets, yarns, rugs and government cloths. Young Englishman, 30, managing a plant of 19 sets cards and 200 looms in England, desires similar position in Canada or the States. Thoroughly practical in every department. Can invest up to $1,500 into a small business of this kind. 1976, Textile World Record.

Designer or Designer and Superintendent. Fancy cassimeres of every description, men's wear in general, also fancy cloakings, golf goods, coverts, dress goods, both piece dyed and fancy, kerseys, etc. Aged 42; married; American. 1250, Textile World Record.

COTTON CARDERS.

Carder in Cotton Mill. Coarse or fine, white or colored, hosiery, Egyptian, etc. Age 35; Canadian; married. 3029, Textile World Record.

Overseer of Carding. Large experience on all kinds of work and both English and American systems. Can furnish first-class references. Had charge of carding in some of the best New England mills. 3009, Textile World Record.

Overseer of Carding. Age 39; married. Worked on coarse and fine numbers and combers. American and English machinery. 3012, Textile World Record.

Overseer of Carding or cotton ring spinning. Worked on carded and combed Peelers, Egyptian, and Sea Island cottons, making yarns from 8 to 80. 3015, Textile World Record.

Overseer Cotton Carding or Spinning desires position. Age 47; American; married. Is familiar with all the modern makes of English and American machinery, revolving top flat cards, single and double carding. 2073, Textile World Record.

Boss Carder. Aged 28. Worked on plain goods. Will go South or anywhere. Steady man, and excellent references. Also a frame spinner. 1759, Textile World Record.

Overseer of Cotton Carding. Age 32; married. Carded and combed yarn, fine and coarse, lenos, lawns, shirtings. English and American makes of machinery. References. 3025, Textile World Record.

Overseer of Carding or Ring Spinning. Age 35; American. Sheetings, prin s and yarns, coarse and fine. Worked on most American machinery, but is more familiar with Lowell & Whitin. 1915, Textile World Record.

Carder and Spinner, also twister, spooler and winder. Will go anywhere, but prefers New York state. Age 30; American. Shoddies and cotton mixes, camel hair, noils from 1 to 7 run for weaving or knitting. 2082, Textile World Record.

WOOLEN CARDERS.

Overseer of Woolen Carding, age 32; American; married. Good experience and excellent references. Worked in kerseys, meltons, cheviots, cassimeres, coverts, dress goods, broadcloths, etc. 2060, Textile World Record.

Overseer for Washing, Carding or Combing wool for worsted wants to better himself. Speaks German, French and English. Best of references. 2033, Textile World Record.

Carder, or carder and spinner. Age 49; American. Has worked on all kinds of woolens, and of late on shoddy and cotton mixes. Is familiar with Davis & Furber machines. Excellent reference from past employer. 1944, Textile World Record.

Overseer of Carding and Spinning. Worked on dress goods, flannels, blankets, overcoatings, plush goods. Good and long experience. Wants position at once. Steady man. 2079, Textile World Record.

Overseer Wool Carding, experienced on all kinds of stock, wool and cotton, wool, cotton and shoddy mixes, thoroughly up to date. Good manager of help, a hustler, and not afraid to work. Strictly temperate, steady and reliable. American, 43 years of age. Best of references. 1953, Textile World Record.

Overseer of Carding and Spinning. Middle aged; English; married. Dress goods, flannels, blankets, overcoatings and plush goods. English and American makes of machinery, also an expert on the Bollette condenser. 2079, Textile World Record.

COTTON WEAVERS.

Overseer of Weaving wants position. Practical experience from weaver, loom fixer, secondhand to overseer, on all kinds of looms and make of goods. References. Good manager of help. Married man; 35 years of age. 1806, Textile world Record

Overseer of Cotton Weaving. Sheetings, sateens and all kinds of fancies from 2 to 24 harness, lenos, lappets and jacquard. Age 32; English and married. 1934, Textile World Record.

Boss Weaver, who is familiar with cotton, woolen and worsted looms and all classes of goods, is open to a position in a large mill. 46 years of age; American; married. Strictly temperate and is recommended by some very large N. E. woolen and cotton mills. 1959, Textile World Record.

Overseer of Weaving in cotton mill. Worked on lawns, dimities, sheetings, corduroys, velveteens, etc. Colvin, Mason, Whitin, Kilburn & Lincoln, Knowles and Draper looms. 3011, Textile World Record.

Overseer of Weaving or assistant superintendent. Age 33; English; married. Worked on prints, sheetings, colored goods, etc. Prefers New England. Good experience, and first-class references. 3041, Textile World Record.

Overseer of Weaving. Age 35; Scotch; married. Good experience, and excellent references, Crompton, Whitin, Lowell, Colvin, Woonsocket and English looms. Sheetings, lawns, ginghams, flannels, fine worsteds, dress goods, shirtings and novelty goods. 2016, Textile World Record.

WOOLEN WEAVERS.

Overseer of Weaving, also designer. Men's wear, woolen and worsted, and fancies of all kinds, cotton worsteds, dress goods. Knowles and Crompton looms. Age 35. 3056, Textile World Record.

Young Man, American, wants position as boss weaver or assistant superintendent. Has worked on fancy worsteds, cassimeres and cheviots. Can also design. 1712, Textile World Record.

Overseer of Weaving, or would take good second hand job. Age 42; married. Worked on dress goods, suitings, plaid backs, cloakings, meltons and other classes of goods. Worked on Crompton & Knowles loom. 3016, Textile World Record.

Woolen Boss Weaver. Steady, reliable and an excellent man in a weave room. Has worked on almost all kinds of woolen goods, and is familiar with Crompton & Knowles looms. Will accept position for not less than $2.50 per day. 2085, Textile World Record.

Boss Weaver or Designer, or could fill a position as all around man in a small mill. Age 42; Scotch; married. Worked on fancy cashmeres, blankets, flannels, carriage robes, and otner fancy goods. Is familiar with Crompton & Knowles, Davis & Furber, and other looms. Wants to go West or South. 1940, Textile World Record.

Boss Weaver or assistant designer. Wants position with a firm who is willing to advance a man as he proves himself worthy. 28 years old; married, and a steady worker. For past six years worked in all parts of the weave room and pattern room, pattern weaving and dressing, chain building, harness raising, perching, fixing and regular weaving. Now taking course of study in woolen and worsted designing. Excellent reference. 2019, Textile World Record.

COTTON SPINNERS.

Overseer of Mule Spinning who has had a wide experience in large New England mills on yarns ranging from 24's to 160's is open to a position. 37 years old; American. Good references. 2003, Textile World Record.

Cotton Mule Spinner. Age 42; French; married. Has worked on prints and sheetings and on yarns from 9's to 50's. First class references. Two years' experience as secondhand and five as overseer. Wants $2.50 per day to start with. 1690, Textile World Record.

Secondhand Spinner. Held positions of charge of cone and tube winding and spooling, also section of spinning frames. Cotton yarns 8's to 100's on twisters, spoolers, winders, warpers. 3030, Textile World Record.

Overseer of ring spinning, spooling, warping and dressing. Will not go South. Middle aged; American; married. Good experience and references. 3059, Textile World Record.

Boss Ring or Mule Spinner. Age 43; English; married. Asa Lee mules, Lowell Machine Shop, Platt, Mason mules; Howard & Bullough, Lowell and Mason frames. Yarns from 5's to 90's. 3001, Textile World Record.

Overseer of Cotton Mule Spinning. Understands Mason and English makes of mules. Has worked in mule room sixteen years, five years as second hand and a year and a half as overseer. 28 years old; married; steady and temperate. Would like to get work in N. E. or New York states. Has worked on colored hosiery yarn and filling. 1822, Textile World Record.

Overseer of Ring Spinning. Aged 42; American; married. Ginghams, sheetings, awnings, denims, etc.; $3 to $4 per day. 3018, Textile World Record.

Overseer Ring Spinning, Warping and Spooling. Is experienced on white work from Nos. 4's to 30's. Is familiar with Whitin and Lowell Machine Shop spinning frames and spoolers and warpers. Wants $3 per day to start with. Age 39; American; married. 1703, Textile World Record.

WOOLEN SPINNERS.

Overseer of woolen spinning desires to make a change. Is familiar with suiting, union, cassimere, satinet and knitting yarns and all ordinary makes of machinery. 30 years of age; American; married. Good references as to character and ability. 1987, Textile World Record.

Overseer Woolen Spinning. Is thoroughly competent to take charge of a large spinning room. 38 years old; French; married. Has spun yarns for flannels, tweeds and knit goods, also cotton and wool mixes, shoddies, ranging in all from 1/2 to 14 runs. Is familiar with Davis & Furber, Johnson & Bassett, Platt and other makes. Very satisfactory references. 1917, Textile World Record.

Worsted Spinner or Section Hand. Age 22 and unmarried. At present employed, but not satisfied with surroundings. Would accept moderate pay. 1709, Textile World Record.

Overseer of Ring or Frame Spinning, or would take superintendent position. Age 41; married. 2040, Textile World Record.

Boss Spinner. Age 34; Scotch. Worked on all wool, cotton and wool and shoddy mixes. Will not go West, South or to Canada. References. Good experience. 3032, Textile World Record.

Overseer of Woolen Spinning. Age 44; American; married. Worked on cassimeres, flannels, tweeds and dress goods. Johnson & Bassett and Davis & Furber mules. Will not go West or South. Good experience and first-class recommendation. 3049, Textile World Record.

DYERS.

Dyer. Second-hand in large house, or boss dyer in small reliable woolen mill. Would accept good offer as chemist to some mill. Age 25; American. Textile graduate, and has held various positions in the laboratory and with dyestuff dealers during past three years. 2097, Textile World Record.

Dyer, Scourer and Bleacher in knitting mill. Age 39; married. All grades of underwear, spring and latch needles. First-class recommendations. Will not go West or to Canada. 3004, Textile World Record.

Dyer on cotton and woolen piece goods, yarn and fast black on cotton. Age 42; married. 3021, Textile World Record.

Overseer of Dyeing and Bleaching. Age 38; Scotch; married. Denims, awnings, ticking, outing flannel and madras. First-class references. 3022, Textile World Record.

Boss Dyer and Bleacher. Age 34; English; married. Yarns, warps, knit goods. Can give good references. Wants $4 or more. 3020, Textile World Record.

Dyer or chemist. A young man 26 years old; single. Cassimeres, dress goods, overcoatings, cloakings, etc. 3057, Textile World Record.

Superintendent or assistant of dye or bleach works. Age 35; English; married. Will not go to Canada. 3053, Textile World Record.

Boss Dyer. German. Fifteen years' practical experience. Would like to go West or South. Worked on yarn, piece goods, raw stock, knit goods and hosiery. Can furnish references. 3045, Textile World Record.

Practical Dyer is open for engagement and would like to correspond with responsible firm. Has a thorough knowledge of the dyeing of hosiery and underwear, cotton, wool, and mixed goods in all percentages, balbriggans, etc. In last position 9 1/2 years. 1513, Textile World Record.

FINISHERS.

Finisher of Cotton Goods, also worsteds, by calender, hot press and beetle, also understands frames, starching and mercerizing. Age 25; English. 3006, Textile World Record.

Finisher, both wet and dry. Age 28; English; married. Shirtings, ginghams, cotton dress goods, mercerized effects and men's cotton suitings and trouserings. Excellent references. 3007, Textile World Record.

Cotton Finisher. Age 27. Worked on prints, lawns, dimities, muslins, ducks, drills, Madras, etc. Understands folding and packing. 3005, Textile World Record.

Overseer of Finishing, worsted goods, white or fancy. A young man; married; English. Has had full charge of piece dye finishing. 3019, Textile World Record.

Overseer of Finishing. Prefers a satinet mill. Eight years' experience as overseer. Aged 47. 3017, Textile World Record.

Boss Finisher. Worked on broad cloth, cheviots, kerseys, coverts, meltons, piece dyes, dress goods. Prefers Massachusetts, but will go anywhere in New England. Not employed and wants place at once. Young man; American. 3046, Textile World Record.

Overseer of Finishing. Age 30; American; married. Woolens, worsteds and cotton mixes. Prefers worsted mill. 2080, Textile World Record.

KNITTERS.

Foreman Knitter in underwear mill. Age 30; American. Familiar with Campbell & Clute, Tompkins, Scott & Williams and Cooper machines. 3038, Textile World Record.

Knitter. Worked on light and heavy weight ladies' ribbed vests and shaped vests, and all kinds of common knit goods. Familiar with Champion, Nye & Tredick, Star, McMichael & Wildman machines. Wants work in Pennsylvania or Western States. 3037, Textile World Record.

Boss Knitter. finisher or machinist. Worked on nearly all kinds of knit goods, and nearly all kinds of latch needle knitting machines and all kinds of machines used in finishing underwear. 889, Textile World Record.

Overseer Boarding and finishing hosiery. All kinds of men's, women's and children's hosiery, except silk. Age 41; American; married. Can furnish references. 3035, Textile World Record.

Machine Fixer or Foreman desires position in good mill. Several years' experience on full automatic machines, knitters, ribbers, loopers, etc. Age 24. Perfectly sober and reliable. Experienced on cotton and worsted. 3055, Textile World Record.

Foreman or Second Hand of Knitting Room. Married; 30 years old. Nine years' experience on hosiery and some on underwear. Familiar with several different makes of full automatic hosiery machines, including Mayo, Standard, Victor, Scott & Williams. Wants a place where he will have steady work. Worked on wool, cotton and lisle. 2093, Textile World Record.

Fixer on rib machines, loopers and sewing machines. An American; married. Not employed and wants position at once. Will not go South. 3050, Textile World Record.

DESIGNERS.

Designer in small mill or assistant in large mill. Age 22; Scotch; single. Has worked on fancy cassimeres, plaid backs, coverts, unions, worsted trouserings and shirtings. Fair knowledge of Jacquard designing. Johnson & Bassett mules, Davis & Furber dresser, and Knowles looms. Is willing to work for moderate salary, with chance of promotion. 1837, Textile World Record.

Smart Designer, high class worsteds and coatings and trouserings. Thorough experience leading factory. Now abroad; anxious to find employment in this country. Moderate start. 1816, Textile World Record.

Assistant Designer on woolen or worsted dress goods and suitings is open to a position. Age 21; American; single. A graduate of one of the largest textile schools in the country, and has had experience in a good New England mill. Also understands flannels and satinets. Good references. 1923, Textile World Record.

Designer or Assistant Superintendent desires a position. 27 years old; Scotch; married. Familiar with all well known makes of machinery and with woolen, worsted and cotton goods. Good references. Will go to any part of the United States. Terms reasonable. 1996, Textile World Record.

A Young Man, 23 years of age, English, would like a position as assistant designer or boss weaver. Has worked on woolen dress goods, cloakings, suitings and worsted suitings. Good references. Moderate wages. Three weavers in family. 1997, Textile World Record.

Designer or Assistant Designer. Woolens and Worsteds. Five years' experience in the Pattern Room as weaver and foreman. Conversant with all the details, practical and technical. First-class references. English; married; age 28. 3031, Textile World Record.

MISCELLANEOUS.

Loom Fixer. Age 27. Knowles and Crompton looms. Wants not less than $2.25 per day. Will not go West or to Southern States. 3014, Textile World Record.

Overseer of Spooling, warping, beaming, slashing and web drawing. Age 37; married. 3010, Textile World Record.

Spare Hand Loom Fixer. Wants place where he can settle down. Is familiar with Crompton & Knowles looms. Age 40. 2091, Textile World Record.

Master Mechanic in cotton mill. Wants $1,500 to $2,500 per year, according to duties and position. Can take place at once. Will not go to Western States or Canada. Familiar with steam engines, pumps, boilers, water wheels and complete cotton mill equipment. 3039, Textile World Record.

Colorist and color mixer for all kinds of printing. Also understands plush printing and extract work. 10 years' experience. Can give references. 2045, Textile World Record.

Master Mechanic wishes position in the North. 35 years old; married. Worked 15 years on repairs. Wants $3.50 per day. Has license for running engines and boilers Understands all kinds of water wheels and care of same, dynamos and electric lights and also gas houses, and a good knowledge of building, all kinds of wood work and piping and blacksmithing. Understands cotton mill repairs as good as the best man at such work. 2025, Textile World Record.

An Expert on soap making and wool scouring will be open to a position shortly. Is familiar with the treatment of all grades. About 40 years old; English; married. Has worked for one concern in the United States for 12 years. 1980, Textile World Record.

Paymaster or Bookkeeper. Agent or Manager wood or iron working plant or small cotton mill. 28 years' experience. Expert accountant. Can take charge of all the office work in large factory or do all myself in small factory. Good references. Will go anywhere in New England or Middle States. 1881, Textile World Record.

A Second-class Engineer, 48 years of age, American, would like a position as such in a N. E. mill. Is steady and reliable. Good references from former employers. 1965, Textile World Record.

A Young Man who thoroughly understands the keeping of mill books would like a position in the Southern States or would go to Cuba or Puerto Rico. Is a first-class man and perfectly familiar with general office work. An American; 22 years of age; single. Steady and reliable, and can give good references. 1914, Textile World Record.

Overseer of Cone Winding and spooling or ring spinning, who understands Universal, Foster, Broadbent and Payne winders, and Whitin and Mason frames, desires a position. Has worked on carded and combed yarns from 4's to 160's; also, mercerized, gassed and bleached yarns from 2 to 8 ply. Young man; American; married, and can give satisfactory references from large mills. 1960, Textile World Record.

Overseer of Warping, Spooling and Winding. Dress goods and cloth. Will not go to Canada. Aged 40; married. Good experience. References. 3027, Textile World Record.

Asst. Superintendent. Young man, 26, graduate of Lowell Textile School (Woolen and Worsted Course). Has had considerable experience in setting up machinery, and worked in nearly every department of mill. Wants position in which there is a good chance to advance. 3040, Textile World Record.

Second Hand in cloth room desires position. At present has charge of samples in large mill. Has worked on all classes of cotton goods. Strictly temperate. 3048, Textile World Record.

USEFUL BOOKS

General Subjects—Cotton or Woolen.

Manual of Weave Construction, by *Ivo Kastanek*, Edited and arranged by S. S. Dale . . $1.50

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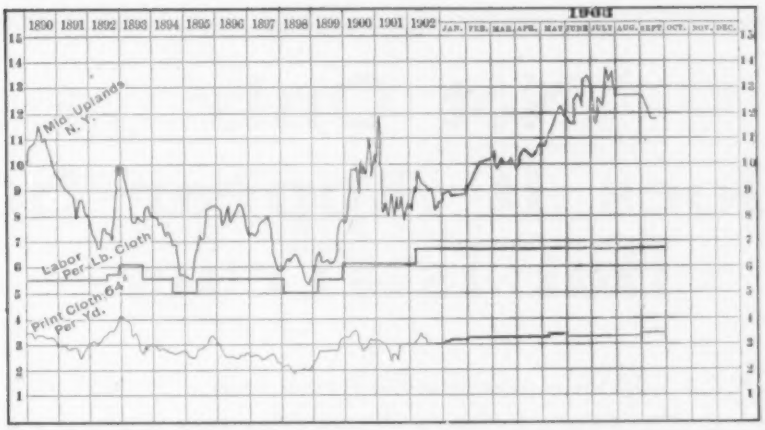
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1903
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Mid. Uplands N. Y.
Labor Per Lb. Cloth
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CHART SHOWING RANGE IN THE PRICE OF COTTON TO DATE.

The Cotton Market.

Spot cotton has declined since our last review to 11 3/4 cents for Middling Uplands, which, at this writing, is the prevailing quotation. Futures have also declined but this is not accompanied by any short selling, the general opinion being that the statistical position makes the bear venture very risky. The crop is about four weeks behind this year and there have been many reports put in circulation of the ravages of the boll weevil and the boll worm. The damage has probably been exaggerated, although there is no question that these pests have reduced the crop by many thousands of bales.

With idle mills in every cotton manufacturing town in the world it is a certainty that the new crop will be quickly taken up, probably more quickly than ever before. The movement of new cotton has been quite large and this accounts for the decline in spot cotton.

While prices for yarn have eased slightly in sympathy with the decline in cotton, the market has a strong undertone, and the cloth market is decidedly firmer. The extensive curtailment in production by both Northern and Southern mills has had its effect on the cloth market and buyers have been somewhat anxious to cover their requirements before further advance takes place. Not only our own, but foreign mills are without cotton and it is a conservative opinion that a higher range of values will prevail in the future than has been the rule during recent years.

On September 18 Middling Uplands was quoted at 11 3/4 cents, and this is higher than on the same date of any year since 1882. In the last named year that grade sold for 12 5/8 cents. The Chronicle estimates the world's visible supply of cotton on September 18 to be 1,000,166 bales as compared with 1,545,365 bales in 1902, 1,385,453 bales in 1901 and 1,098,014 bales in 1900. Although the visible supply is but 100,000 bales less than in 1900 an important difference consists in the condition of the invisible supply, that is, the stock in mill storehouses and Southern cities. The mills are bare of cotton and very little if any old cotton is in the South. For this reason an accurate statement of the total supply both visible and invisible, if it could be obtained, would doubtless give strong reasons for the maintenance of a high level.

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Established 1860—Incorporated 1899.
THE S. BLAISDELL, JR., CO.,
COTTON, EGYPTIAN PERUVIAN
American Long Staple a Specialty. Shipments direct to mill from Egypt, Peru and all American Southern Points.
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Cotton Waste Purchased on Yearly Contract from Mills.

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Textile, Laundry and Powdered
SOAPS
140-180 Central Avenue,
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WM. BARNETT, Representative, 730-32 S. Broad St., Phila.
Established 1861. Reorganized and Incorporated 1898.

Not Only Does It Appear So But Is—True.

A tree with blight cannot produce good fruit. No less true is it that wool scoured with strong alkalies (caustic or soda ash) will not produce that soft, lofty effect, or that fine finished product which every mill is striving to get and maintain.

Wyandotte Washing Soda

used in connection with strong alkalies for scouring wool, counteracts that harsh effect which these produce when used alone.

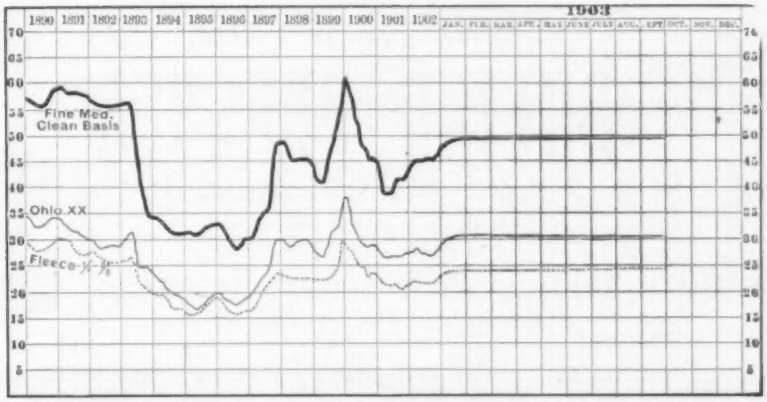
None Genuine except with a Card bearing this Trade Mark.

In Every Barrel.

As space will not permit the giving of full directions for the use of Wyandotte Washing Soda for wool scouring and for washing of the finished product, we shall be pleased to have you write us for further particulars.

That Wyandotte Washing Soda is well worth your consideration admits of no question. And, as our guarantee protects you against loss, it is good business policy to give this article a trial. Then place your order with your supply house without delay.

The J. B. Ford Co., Sole Mfrs. Wyandotte, Mich.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Fine Med. Clean Basis
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CHART SHOWING RANGES IN THE PRICE OF WOOL TO DATE.

The Wool Market.

Since our last report the wool market has shown no material change. Prices have remained stationary and the only indication of weakness has been a greater disposition on the part of holders to part with wool at offers which have been standing for weeks without acceptance, especially on fine wool. This disposition is due to the dulness in worsted goods. There has been a marked change in fashion during the past year from worsted or carded woolen fabrics, and this has had its effect on the wool market. Owners of wool profess great confidence in an early upward turn. This is an attitude that may be expected in view of the fact that the new clip has been so recently transferred from the grower's to the dealer's hands, and naturally dealers are not talking low prices on stock which has been bought at an advance.

If the price of wool depended upon the balance of supply and demand, there would be no question that a rise would be inevitable. The foreign supply is shut out by the tariff and the requirements for domestic consumption are far greater than the domestic clip. The price of wool, however, is regulated by the demand for wool and the supply of wool and shoddy. When new wool rises above a certain point the manufacturer turns to wool substitutes for raw material with which to manufacture goods at a price which the clothier is willing to pay. The experience of the past few years would indicate that that level is found when fine medium territory reaches 50 cents per pound. Wool has been practically at that level for the past year, and only once in ten years has it risen above it, viz., during the boom of 1899 and 1900, and then only for a comparatively short time.

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Prevents Wool from Shrinking

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Standard Quality Combed Ramie Top and Noils a Specialty

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RamieYarns for all purposes
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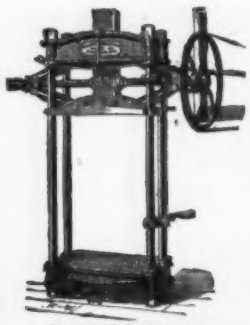

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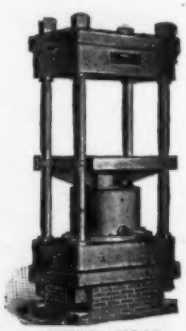

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ALL KINDS OF Spindles USED IN THE MANUFACTURE OF COTTON, WOOL & SILK

IMPROVED UPRIGHT SPOOLERS
TO SPOOL FROM COP, SKEIN, OR BOBBIN.

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MANUFACTURERS OF
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SPOOL TAPES, BINDINGS AND NARROW FABRICS FOR UNDERWEAR AND OTHER TRADES.

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Spool Tapes a Specialty.

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CROSBY SPRING-SAVE GLOBE AND ANGLE VALVE.

NO BETTER VALVE CAN BE MADE.

All Working Parts Renewable Without Removal from Piping. ALL PARTS INTERCHANGEABLE. THEY have a full opening through them. WHEN COMPLETED ARE TESTED under more than 400 lbs. pressure. We guarantee them NOT TO LEAK AT HIGH PRESSURES. MADE IN BRASS AND IRON in the various styles furnished to the trade. Try One or More Valves and BE CONVINCED.

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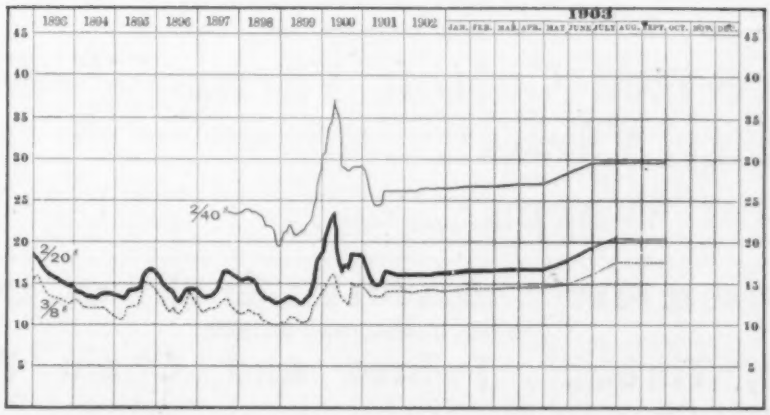
Stores: BOSTON, NEW YORK, CHICAGO, LONDON.

Office and Works: BOSTON, MASS.

Yarn Department.



GRAPHIC CHART SHOWING RANGE OF PRICE OF COTTON YARN TO DATE.

The Cotton Yarn Market.

The cotton yarn market is in a state of uncertainty owing to the recent decline in the price of raw cotton and a belief on the part of the buyers that a still further drop will take place before bottom is reached, with a corresponding effect on the price of yarn and manufactured goods. This is an opinion which is shaped in great measure by the desire of the buyer, and whether it is well founded can be shown only by waiting the developments of the new cotton season. In the natural order of things lower prices of cotton will prevail during the delivery of the new cotton, but mills have such small stocks, many of them having none at all, that this year is likely to prove an exception to the rule that has obtained in times past. The longer spinners delay purchasing the new cotton, the greater will be the risk they run of being caught next year as many of them have been this year, with not enough cotton on hand to keep them going. On the other hand a general movement to replenish depleted stocks at the mill will tend to counteract the depressing influences of large receipts of the new crop. All these are factors of unknown extent, and on which the spinner and buyer must speculate. The prosperity of the country is a strong point in favor of higher prices and the temporary fluctuations of yarn and cotton from week to week and month to month are but the results, in many cases, of manipulation and fluctuating sentiment among buyers and sellers.

In the long run the balance of supply and demand is bound to prevail and the statistical position of cotton and cotton yarn is such as to indicate that it will be good business policy to buy when either cotton or cotton yarn goes down. At present spinners are inclined to shade prices a little in sympathy with the price of raw material. Whether this will continue or not is a question. Certainly it will be very risky for knitters and weavers to enter into contracts with orders for deliveries of goods at the present price of yarn without balancing such contracts with orders for the raw material in the shape of either yarn or cotton. We quote as follows:

Eastern Cops.

6's	19¾
8's	20
10's	20¼
14's	21¼
16's	21¾
22's	23
24's	23½
26's	24
30's	25
34's	26
36's	26½
40's	27½

On cones, ¾c. more up to 14's; 1c. more from 15's to 22's; 1½c. from 23's to 35's, and 2c. above that.

Eastern Two-Ply Skeins, Carded Peeler.

12's	19½-20
14's	20-20½
18's	22-22½
20's	23
22's	23½
26's	24
28's	25
30's	26
36's	27
40's	29
45's	32
50's	34
55's	38
60's	45

THE J. R. MONTGOMERY CO.,

Windsor Locks, Conn.

MANUFACTURERS OF

Mercerized Cotton Yarns Gives the High Silk-Like Lustre in Knit Goods and Woven Fabrics.

Novelty Yarns Boucle, Bourette and Spirals, in Cotton, Wool, Worsted, Mohair and Silk.

Cotton Warps on Beams, Jack Spools and Tubes. In Fancy, Twist, Colors and Printed.

GREENE & DANIELS MFG. CO.,

COMBED, CARDED AND GASSED

Yarns, Threads, Twines and Chain Warps,

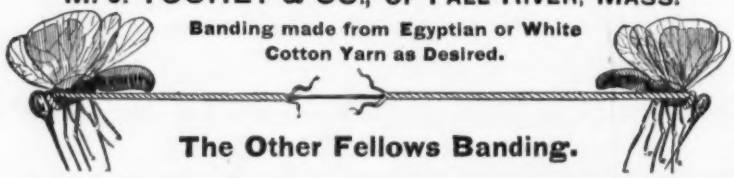
Colored and Bleached Yarns Furnished in any manner desired by the trade.

Pawtucket, R. I.

THESE MULES CANNOT BREAK THE BANDING —MADE BY—

M. J. TOOHEY & CO., OF FALL RIVER, MASS.

Banding made from Egyptian or White Cotton Yarn as Desired.



The Other Fellows Banding.

MONUMENT MILLS,

Manufacturers of

White, Colored, Fancy and Double Twist

COTTON WARPS

HOUSATONIC, MASS.

4s to 60s.

Dana Warp Mills

WESTBROOK, ... MAINE

White and Colored Warps 6s to 50s Single and Ply

Mule Cops From 30s to 50s from American & Egyptian Cotton

Eastern Two-Ply Warps, Carded Peeler.

2/30's	26-27
2/36's	28-29
2/40's	29-30
2/45's	32-33
2/50's	34-35
2/60's	45-46

Egyptian Weaving Yarns.
Single Skeins Combed.

30's	38-39
35's	40½
40's	42½
45's	44
50's	46
55's	52-53
60's	56
70's	60

Two and Three Ply Skeins, Combed.

30's	44
36's	45½
40's	48½
45's	51
50's	54
55's	56
60's	60
70's	67½

The Philadelphia Yarn Market.

The yarn market has been undergoing a readjustment process in line with the decline in cotton, and in anticipation of the lower prices which are expected on the new crop. Buyers generally are very firm in their belief that prices will decline still further. Whether they will or not will largely be decided by the course of the cotton market. Crop reports are much more bullish now than a few weeks back, and some well informed spinners are refusing to make further concessions in prices. If the textile business of the country is as good this year as it was last, prices can be maintained at the present level.

The weaving yarn market has been weaker than the knitting yarn market, probably on account of the accumulation of stock during the strike.

Combed and mercerized yarns are in fair demand. We quote prices for prompt delivery as follows; some spinners are willing to shade these prices for delivery in November and December:

Southern frame cones (good quality):—

7's and coarser	18-18¼
8's and 9's	18¼-18½
10's	18½-19
12's	19-19½
14's	19½-20
16's	20-20½
18's	20½-21
20's	21-21½
22's	21½-22
24's	22-22½
26's	23
30's	24
40's	29
50's	36

BUCKINGHAM, PAULSON & CO.
Commission Merchants
COTTON YARNS of all Descriptions
83 LEONARD STREET, NEW YORK
302 Chestnut St., Phila. 210 Munroe St., Chicago, Ill.
Cash Advances, Cash Sales and Prompt Returns. Consignments and correspondence solicited.

JAMES E. MITCHELL & CO., COMMISSION MERCHANTS.
Cotton Yarns
FOR ALL PURPOSES.
122-124 Chestnut Street, PHILADELPHIA, PA.
Brown Building, 185 Summer Street, BOSTON, MASS.

CATLIN & CO.,
Yarns.
67 CHAUNCY STREET, BOSTON.
216 CHURCH STREET, NEW YORK.
206 CHESTNUT STREET, PHILADELPHIA.

Ballou Yarn Co.
PROVIDENCE, R. I.
Harness and Seine Twines and other Job Gassing, Winding, etc. All Numbers.
GASSED YARN SPECIALTIES

A. D. SALKELD & BRO.,
With FRED'K VIETOR & ACHELIS,
YARNS.
66-72 LEONARD STREET, - NEW YORK.

FRED STERNBERG & CO.
Successors to EICHMANN & STERNBERG,
530 Broadway, - NEW YORK.
MERCERIZED, TURKEY RED, GASSED } COTTON YARNS.
JACQUARD and HARNESS TWINES.

J. S. DODDS,
346 Broadway, N. Y. Life Bldg., New York, N. Y.
MERCERIZED YARNS
Two and Three Ply, for all purposes,
In Peeler, Egyptian and Sea Island, gassed and ungassed, natural and dyed. Fast Black for cross dyeing a specialty.

EDDY & STREET,
Cotton, Woolen,
Yarns and Braids
Worsted, Spun Silk.
PROVIDENCE, R. I.

CAPACITY, 50,000 Spindles. **ORSWELL MILLS** *FITCHBURG, MASS.*

COMBED COTTON YARNS CARDED

In Chains and Skeins, on Balls, Beams, Spools—Single or Twisted.

THE MALCOLM MILLS CO.,

MANUFACTURERS OF

FANCY YARNS and POLISHED THREADS.

Offices: 229 Chestnut St., Philadelphia.

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Double & Twist and Roving Twists in Black White and other combinations, Randoms, Colors and Mixes.

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FIRE HOSE CORDS From long staple cotton—6s to 20s yarn in 2 to 100 ply—16 lbs. without a knot.

COTTON WARPS On beams—single or ply yarns, grey, bleached or colored.

GLAZED YARNS All plys—any color—for braiders, harness and sewing threads.

UNIVERSAL WIND For braider cops—warp yarns—grey or colored—2 inch to 12 inch traverse.

Dyeing facilities are new and best quality work guaranteed. We are prepared to dye yarns for other parties.

WHITTIER MILLS, Chattahoochee, Fulton County, Ga.

Indian Orchard Company.
Cotton Warps and Yarns.
In Gray and all Colors, Single or two or more Ply, and Cable Cord.
Novelty Yarns.
in Various Patterns, Colors and Twists.
Carded and Colored Cotton.
For Mixing with wool, Machined or in Roving.
Indian Orchard, Mass.
F. Morgan, Pres. H. K. Wright, Treas. W. C. Godfrey, Agt.

Southern high grade mule yarn:—

	Cones.
10's	20½-21
12's	21-21½
14's	21½-22
16's	22-22½
18's	22½-23
20's and 22's	23-23½
24's	24

Southern frame yarn, lower grades:—

6's and 8's	17½
10's	18

Eastern cones (high grade quality):—

10's	22-22½
12's	22½-23
14's	23-23½
16's	23½-24
18's	24-24½
20's and 22's	24½-25½

Lower grades Eastern yarn:—

6's and 8's	18-18½
10's	19

Rise ¼c. per number to 16's.

Skein yarn (mostly Southern):—

4's to 8's soft	17½-18
10's to 12's	18-18½
14's to 20's	19-19½
22's	20
14/2	18½
16/2	19
20/2	19½
30/2	23
40/2	28
16/3 slack	19
12/3 slack	18½
8/3 carpet	17-17½
8/3 slack	17-17½
9/4 slack	17-17½

Warps (mostly Southern):—

14's to 16's	18½-19
20's to 22's	19½-20
26's	21-21½
14/2	19
16/2	19½
20/2	19½-20
24/2	22
30/2	23-24
40/2	28

Mixed colored yarns (mock twist, half colors):—

6's to 10's	20½-21
12's to 14's	21-22
16's to 18's	22½-23½

Silver and jaeger, 1½c. over white.

Mock Egyptian, 2c. advance over white.

Egyptian, 4c. to 5c. above best quality white.

Worsted Yarn.

Spinners are all short of orders and working hard for business. It is certain that weavers generally have no large stocks of yarn as they have refused to place large orders and are buying from

TRY OUR
Silkine, also Lisle Silk
FINISH
—FOR—
Hosiery, Knit Goods, Yarn, Fast Black, Harsh Colors, and Fibres.
O. K. SOAP CO., 968 Franklin St., PHILA.

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COTTON YARNS OF EVERY DESCRIPTION.
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LINEN YARN IMPORTER.
HUGHES FAWCETT, 115 Franklin Street, NEW YORK.
Flax, Hemp and Jute Line and Tow Yarns, For Weaving Purposes.
Linen Jacquard Harness Twines, Fine Cotton Harness and Heddle Twines, For Cotton, Silk, Woolen and Carpet Manufacturers.
Correspondence solicited. Samples promptly furnished.

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Manufacturers of
TWINES, THREADS AND YARNS,
Jacquard Harness Twines of all kind on hand and made to order.
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DEXTER YARN CO.
Cotton Yarns in Cops, Cones and Skeins; on Beams or Spools, Single and Twisted, Cable Cords and Twines.
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Walcott & Campbell Spinning Co.
Fancy Hosiery Yarns
IN ALL COLORS
New York Mills, Oneida Co., New York

ALLEGHENY WORSTED MILLS,

Thomas Wolstenholme Sons & Co.,
MANFRS. OF
ALL NUMBERS
SINGLE AND TWO-PLY,
On Cop or in Skein, for Weaving and Knitting Purposes, in White, Natural and Fancy Mixes.

Worsted
YARNS
Sell Direct,
Office and Mills, Frankford Ave. and Westmoreland St., Phila, Pa.

POCASSET WORSTED COMPANY,

Worsted Yarns.

OFFICES:
6th Floor, Banigan Building,
PROVIDENCE, R. I.

CRANSTON WORSTED MILLS.

Worsted and Mohair Yarns—White or colors, in skeins, on spools, cones, or shuttle bobbins.

Novelty Yarns—of Mohair and Worsted. We are the only manufacturers in the United States making these yarns from the raw material to finished product and making yarns only.

Genapped Yarns of all kinds. Doup Yarns. Harness Yarns. For Braids, etc.

DYERS OF YARN AND SLUBBING. BRISTOL, R. I.

French System. Bradford System.

B. F. BOYER CO.,

MANUFACTURERS OF

WORSTED AND WOOLEN YARNS,

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RICHARD CAMPION,

Selling Agent for
BRISTOL WORSTED MILLS,
HIGHLAND WORSTED MILLS.

Worsted Yarns

ALL QUALITIES AND NUMBERS.

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KEYSTONE SPINNING MILLS CO.,

Manufacturers of
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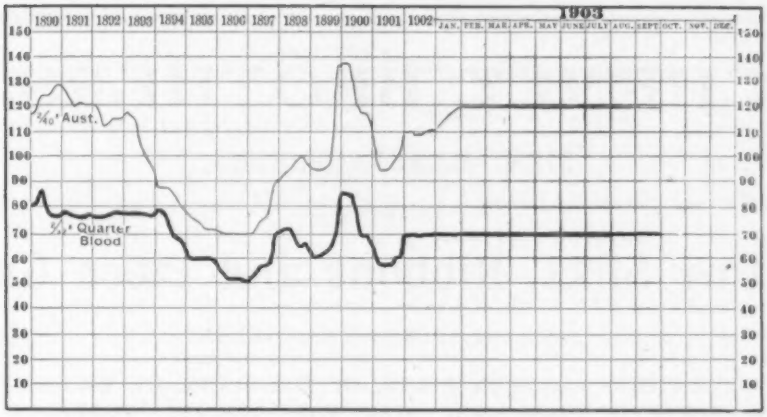

CHART SHOWING RANGES OF PRICE OF WORSTED YARNS.

hand to mouth. In November to December orders are generally placed in good amounts by the knitters as well as the weavers, and spinners are looking forward to that time for considerable business. The key to the situation is the wool man. If he sits on his wool sacks and holds out for high prices the spinners will secure but few large orders and the business will continue to languish as in the present season, but if concessions are made on certain lines to allow spinners to meet the market, a goodly number of orders will be secured. This is particularly true of 1/4 to 3/8 in the English spun yarn and 1/2 blood for French spun yarn.

Buyers all state they are not ordering now but expect to be on the market in November provided the right prices can be made. Buyers started out to insist on prices lower than those of one year ago on the same value, but a general adjustment has taken place during the last six months whereby slightly lower grades of yarn have been used. This means that if relative values of one year ago can be secured the orders will be forthcoming, but this business will be late. To prove this statement we have but to cite the fact that all orders placed for staple cloth have been for very late delivery, whereas in the past, November and December have been the delivery periods, the present orders call for delivery in January and Febru-

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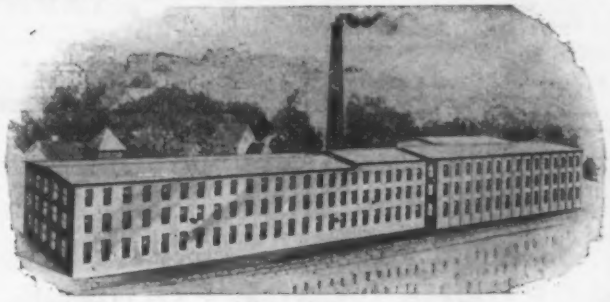

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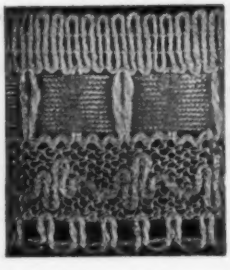

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ary. This means that buyers are holding off as long as possible so that the clothing situation can be well in hand before the cloth is delivered, and there is no doubt but many duplicates must be placed to supply the natural demand.

Some of the weavers at the present time are complaining of the cancellation of early orders and are seeking a remedy for the evil. The weavers are using a yarn which may be called a plated yarn, made from a cotton thread of fine count twisted with a worsted thread of a much heavier number. The result is a very satisfactory yarn and much of it is being ordered from the spinners. The weavers of cotton worsteds have secured some large orders for this cloth, and in many instances have sold their mills up at an advance of 5 cents per yard. The weavers of this class of cloth predicted early in the season that instead of making cotton worsteds, they would be able to turn their looms on all worsted cloth, but although the samples went forth, the orders finally came for the cotton worsteds although they were late.

Weavers of piece dyes are getting orders for serges and clay worsteds, but are buying yarn in small quantities and are keeping their mills going without much profit to themselves. The fancy worsted end of the business for men's wear is decidedly slow, but "like the cloud in the horizon" the demand for this class of cloth for ladies' dresses is increasing largely and much is being sold for this purpose. By next season with the legitimate demand for men's wear and ladies' wear as well, the weavers of fancy worsteds will have all the business they can handle.

The present demand for loosely woven wool goods is destined to be short-lived because they have been forced into style as a makeshift to help clothiers overcome the high price of wool. There is much dissatisfaction with this cloth; buyers state that they know what they want and if the better class of worsted cloth is high they must pay the advance and get what they want.

The manufacturers of bunting and dress goods are doing a fair amount of business and using yarn, but are trying to force the prices of worsted yarn down.

French yarn spinners are securing some orders but are able to see the end of them. Their business is largely of the hand to mouth order at present, but this is expected at this time as their season's business does not begin until November or December. Top makers are holding tops to a high price on account of the price of wool, but the mills are not busy. The trend of business is toward the use of a better class of material, and next season will see a fair but cautious business.

We quote

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Double and Twist Yarns for Woolen Trade.
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Cotton Cloth,
Silesia, Sateens,
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COMBED AND CARDED COTTON.
YARNS 40's and above. AND
FITCHBURG, MASS. WARPS

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Mercerizers, Dyers, Bleachers and Coners,
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Woolen and Merino Yarns,

1 to 10 Runs, at reasonable prices.

All Wool, Mohair and Wool Spun or Mixed Cotton and Shoddy Yarns, in white, gray, and colors.

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Carbonized Stock a Specialty. **FLOCKS**

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Of every description. Capacity 7,000,000 pounds per annum.
Custom Carbonizing and Garnetting a Specialty.

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149 DUANE STREET. RIVERDALE, NORTHBRIDGE, MASS.

2/40's Australian	1.20
2/40's XX Delaine	1.10
2/40's Half Blood	1.05
2/20's Half Blood	.85
2/36's ⅜ Blood	.75
2/26's ¼ Blood	.68

Woolen Yarn.

Spinners continue busy in all branches of the industry. At present all the machinery manufacturing woolen yarn is running,—some of the spinners are busier than others, but all are employed and are not taking on many new customers. This is the slow time for spinners and while there is no rush at present, within the next 30 days this industry will be overworked. The knitters of hosiery are using up yarn ordered and further orders will be placed during the next 60 days.

The orders for yarn for men's wear goods are excellent. The knitters generally are busy and those making all wool underwear are running their mills nights in some instances in order to keep up with orders secured earlier in the season. Most mills have substituted domestic for foreign wool. One large knitter said that last year he purchased large quantities of Australian lambs' wool, but this year he had got out the same garments without using a pound of Australian lambs' wool. Many of the mills are using large quantities of noils and are meeting with great success in making fine underwear out of half Australian lambs' wool and half Australian thread waste.

One of the most serious conditions which the knit goods trade is facing is the cotton problem. The knitters of fine underwear using Peruvian cotton are making as few garments as possible because of the scarcity of this staple and its consequent high price. Many of these mills use as much as 50 per cent. of Peruvian cotton in their yarn, and until the new crop begins to arrive in 30 to 60 days this cotton, being much above a normal price, prevents the profitable manufacture of certain grades of underwear. It is especially disastrous because the knitters are short of material and cannot advance prices at the end of the season, so they are advising their customers to get along as well as they can until the crop comes. Some of the mills have not a bale of either American or Peruvian cotton, and because of this one large mill is only running 4 days per week. Some of the mills that had large stocks of material purchased before the advance in wool and cotton are very busy.

Knitters are beginning to look forward to the new Australian clip and will soon be buying for future delivery. Many knitters buy in Australia direct although the present year will be one in

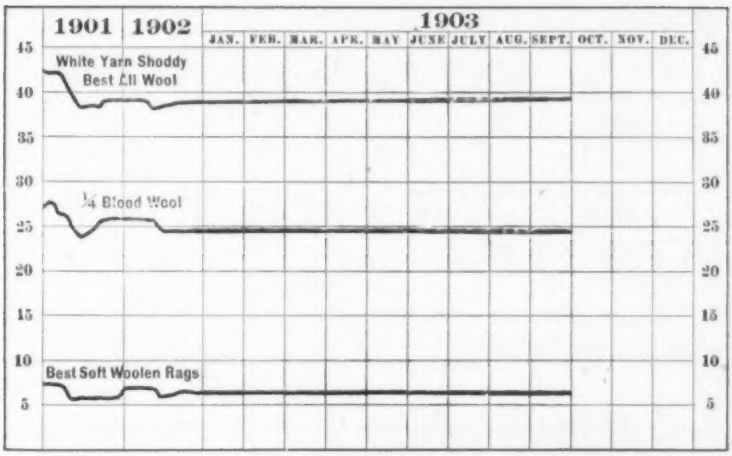

CHART SHOWING RANGE OF PRICES OF SHODDY, RAGS AND NOIL.

which to exercise caution. Much thread waste is being sold at prices ranging from 57 to 65 cents per pound, and this seems to be the cheapest Australian stock on the market. Knitters are short of material and will buy only for immediate consumption. One day they are not interested in yarn or material of any kind, and the next they are anxious to buy at some very low figure.

The London wool sales opened Sept. 15th. The prices for merinos were mostly unchanged from those at the last sale, but inferior descriptions were slightly weaker. Fine crossbred wools were par to 5 per cent. dearer, while medium and low qualities showed an improvement of 5 and 10 per cent. respectively.

The Rag and Shoddy Market.

Business in both rags and shoddy has continued quiet. The collections of rags have been small and inquiries for them have been on a correspondingly limited scale. This is the dull season in wool substitute market, which accounts in large measure for the present conditions. The dullness in the wool market has had its effect on shoddy and nothing would please the rag and shoddy dealers more than to see a pronounced advance in the wool market, something that is not likely to materialize in the near future.

Prices for rags and shoddy have, under the circumstances, been remarkably well maintained. In some cases concessions have been made in order to move stock, but such cases are the exception and not the rule. Worsted stock and cut cloths are firm and in fairly good demand. A slight improvement has taken place in the market for merino stock both in respect to prices and volume of business. Most other grades are draggy and no marked improvement is expected until the opening of the heavy weight season, which is still a considerable distance ahead.

Mills have purchased cautiously and measured their orders by their requirements, the general idea seeming to be that it is good business policy to let the other fellow carry the stock until the buyers of manufactured goods show a disposition to place orders. The firmness of prices for rags has made it impossible for shoddy dealers to make the concessions the manufacturers demand and has resulted in a very small volume of business.

The wool waste market continues quiet and while no change has been made in the price, dealers have been unable to move any large amount of stock. We quote as follows:

SHODDIES AND EXTRACTS.

White yarn, best all wool	38-40
White knit, all wool, best, fine	28-32
White knit, No. 2	23-25
Light yarn, extra fine	25-28
New pure indigo blue	23-25
Fine worsted, new black	26
New blue clip, best, fine	20-22
Dark mixed yarn, extra fine	22-24
All wool yarn, medium and coarse grades	15-20

Merino.

Fine light, all wool, No. 1	24-25
Medium light, all wool, No. 1	16½-17½
Medium light, all wool, No. 2	14-16
Fine black, all wool	20-22
Fine dark, all wool, best grade	20-21
Medium dark, all wool, No. 1	13-15
Medium dark, all wool, No. 2	12-13
Red knit stock, strictly all wool	19-20
Red flannel, all wool	19-20

Cotton Waste For Sale.

Have large lines of Soiled Card, white and colored Oily Card and other Cotton Wastes suitable for the manufacture of Cassimeres, Satinets, Unions, etc. Also Combers and other clean Cotton Wastes for Hosiery, Underwear, etc.

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COTTON SHODDIES,
GARNETTED STOCK, ETC.

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Dark blue for hosiery, strictly all wool, No. 1	17-20
Dark blue for hosiery, not all wool, No. 2	12-14

DELAINE EXTRACTS.

Light	19-22
Medium light	15-17

WOOLEN RAGS.

Regular gray	12-13
Black	14-15
Fancy colors	16-20
Fine merchant tailors, all colors	9-11
Choice light colors	13-15
Browns	12-13
Blacks	9½-10½
Fine blues, plain	9-11
Fine dark	10-11
Medium dark	7-8

Worsteds.

Blue	16-18
Black	18-20

We quote as follows:

Serges.

New black	15-16
New blue	14-15

Flannels.

New scarlet	18½-22
New blue	17-18
Cloakings	3-4

SOFTS AND KNIT STOCK.

Soft woolens, best	7-7½
Old white flannels	14-16
White flannels, No. 2	11-12
Old red flannels	9½-10
Light blue flannels	7½-9
Old blue flannels	6-7
Old plaids	5-7
White stockings	17-18
White hood stock	20-21
Clear hoods	9-10
Red stockings	9-10
Blue stockings	7-8
Fancy stockings, No. 1	7-9
Gray stockings	9-10
Black stockings	9-10
Knit stock comforters	6-7½
Red knit	9-10
Light gray knit	9-10
New light fancies	16-18
New fancies	12-14

Merinos.

Light, fine	13½-15
Light, coarse	7½-8
Fine, dark	12-13
Dark, No. 2	5-6½
Coarse dark	4-4½
Blue	12-13
Blue—seamed	13-14
Black—unseamed	12-13
New black	18-20
Small	3¼-4
Bunting	6-8

FLOCKS.

Shear, fine white, all wool	9-11
Fine indigo blue, all wool	9-9½
Fine black, and blue, all wool	7-8
Fine dark, all wool	5-6
Gig, fine, all wool	3-4
No. 1, black, all wool cut	6-7
All wool, fancy, shear and gig	2½-3½

COTTON WASTE.

No. 1 Spinners	10-10½
No. 1 Machine	6-6½
No. 2 Machine	5-5½
Machine Cop	6-6½
No. 1 Cop	7½-8
No. 1 Card	9-9½
No. 2 Card	8-9
No. 1 Oily Card	4½-5
No. 2 Oily Card	3½-4
Egyptian Card	9½-10
Peeler Combing	10¼-10½
Egyptian Combing	10-10¼
No. 1 Linters	4-5
No. 2 Linters	3½-4
White Clips	6-6½
Colored Clips	3-4¼
No. 1 Picker	2½-3

NOILS.

Australian	48-50
Fine domestic	38-40
½ Blood	24-28
⅜ Blood	22-23
¼ Blood	17-19
Braid	21-22
Carpet (white)	14-18
Carpet (colored)	10-12½

Seedy.

½ Blood	35-37
⅜ Blood	27-30
¼ Blood	23-26

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Guarantee Fast to Wear.
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Fast Colors for the Woolen Trade. Capacity 20,000 lbs. per day.
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Chrome Fast Black F & R, Benzyl Blue and Blue B W. Fast Colors for Wool.

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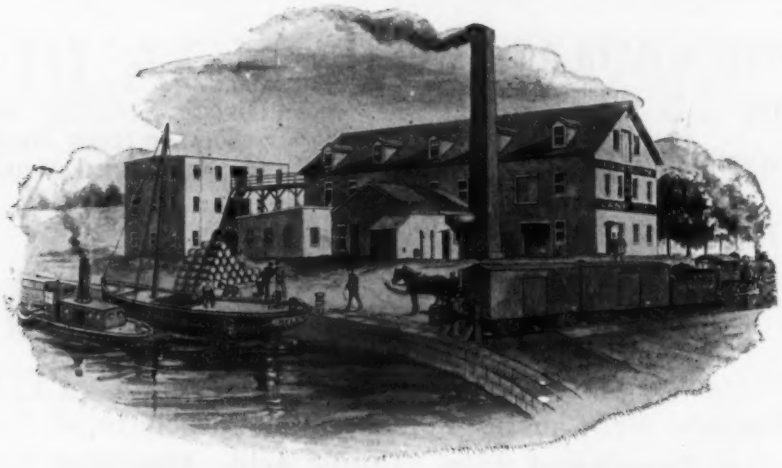

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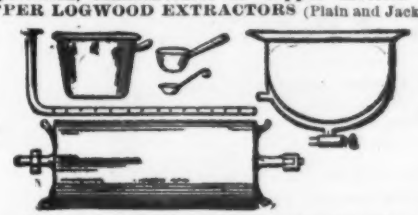

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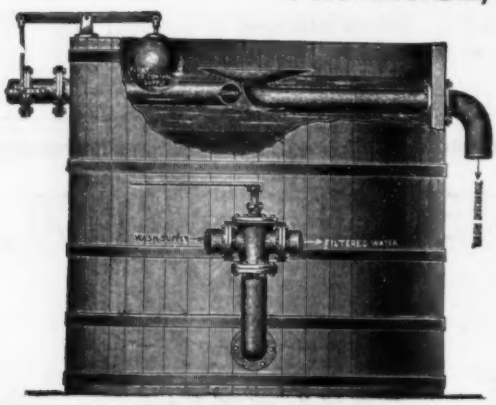

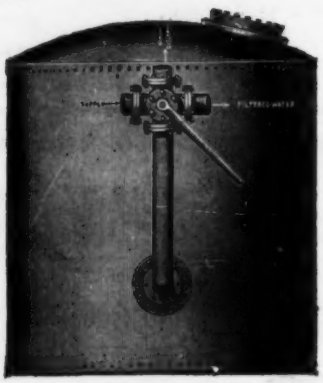

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Cedar and Cypress Vats, Tanks, Dye Tubs, Round-Back Piece Goods' Dye Tubs, Bleaching Tubs, Boiling Kiers, Reservoir, and

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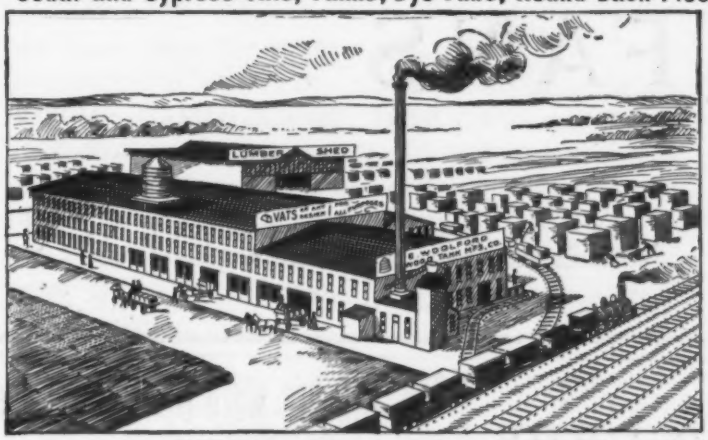

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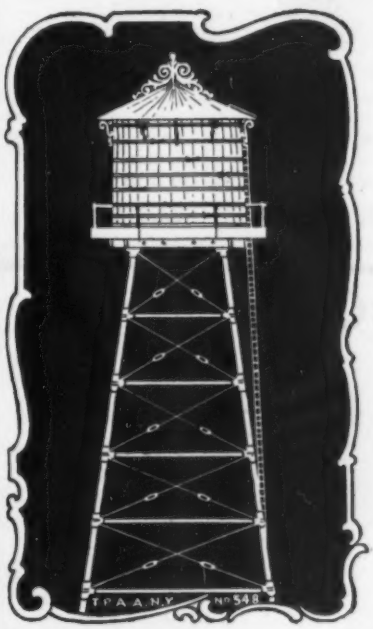

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to you almost on receipt of your order. We will send our men anywhere in the country to erect these outfits.

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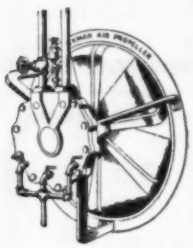

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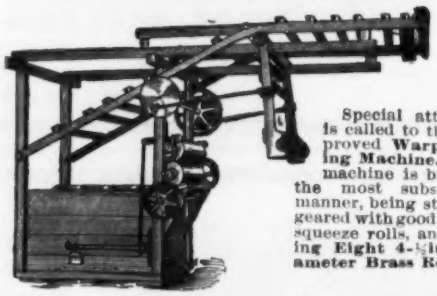

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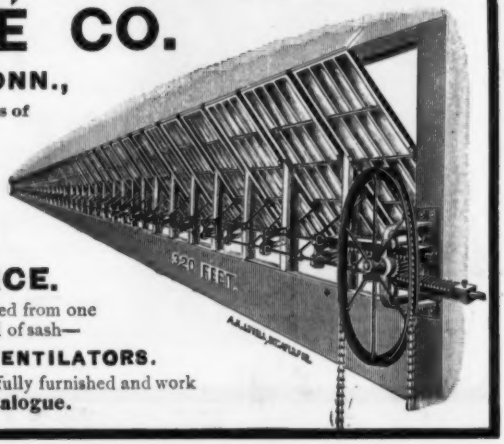

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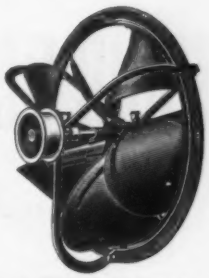

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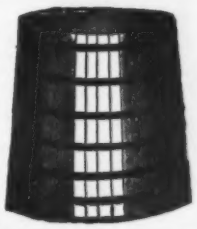

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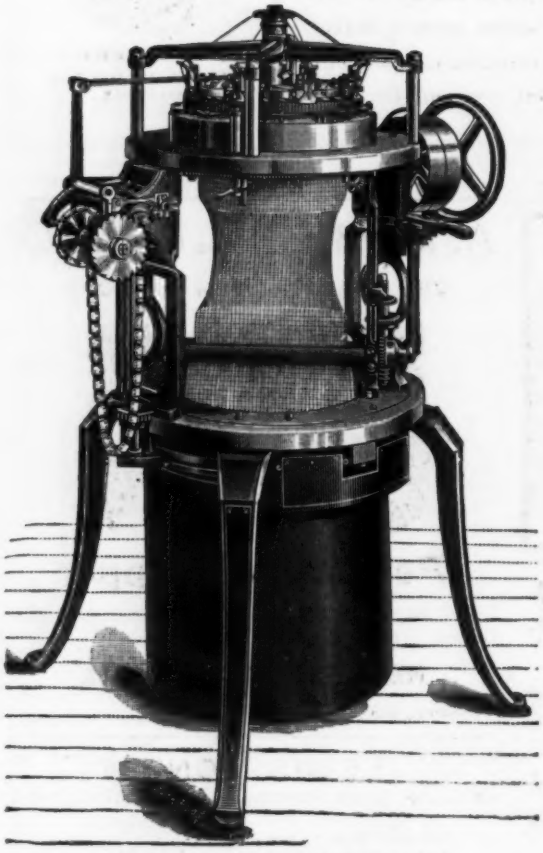
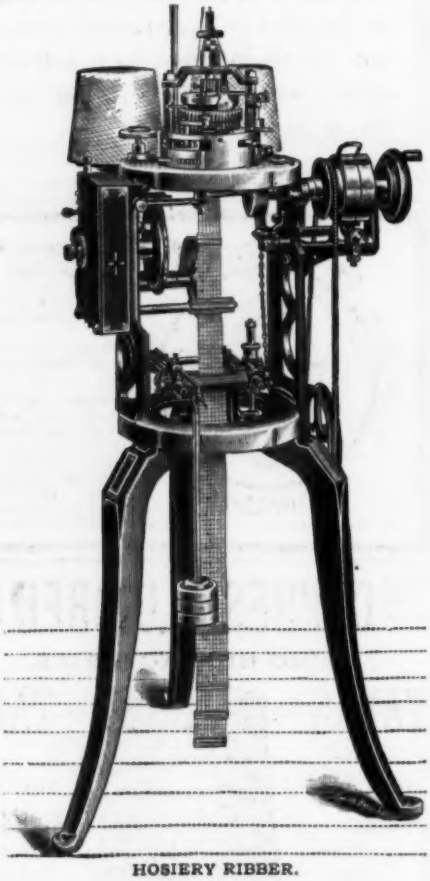
AUTOMATIC AND PLAIN

For all classes of Ribbed Hosiery and Underwear, Combination Suits, Sweaters, etc.



AUTOMATIC BODY MACHINE.



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ESTABLISHED REPUTATION FOR LARGEST PRODUCTION, BEST QUALITY FABRIC, DURABILITY, ECONOMY OF OPERATION

Full Particulars, Description and Samples Furnished upon Application to the

McMICHAEL & WILDMAN MFG. CO.

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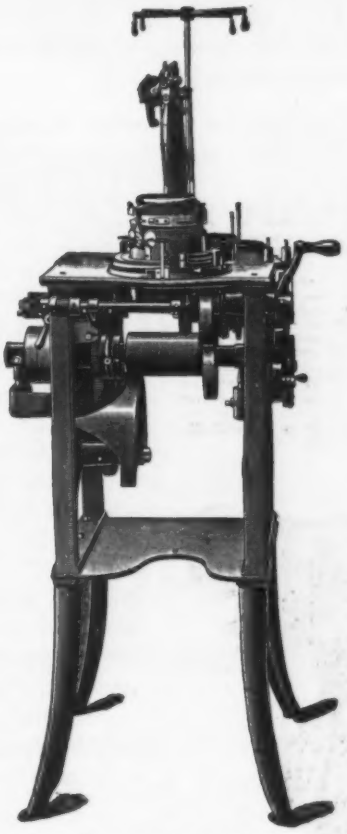
Acme Automatic Knitter

FOR SEAMLESS HOSIERY

ALL KINDS AND GAUGES



Best method of transferring ribbed legs and tops.

Greatest production of perfect work at least cost.

All latest attachments and improvements.

Our new type of machine, just out, having absolutely positive feed on pattern mechanism, which is set by dial, and graduated disc when changing styles and sizes, is one of the greatest improvements in knitting machines for a long time.

For particulars address

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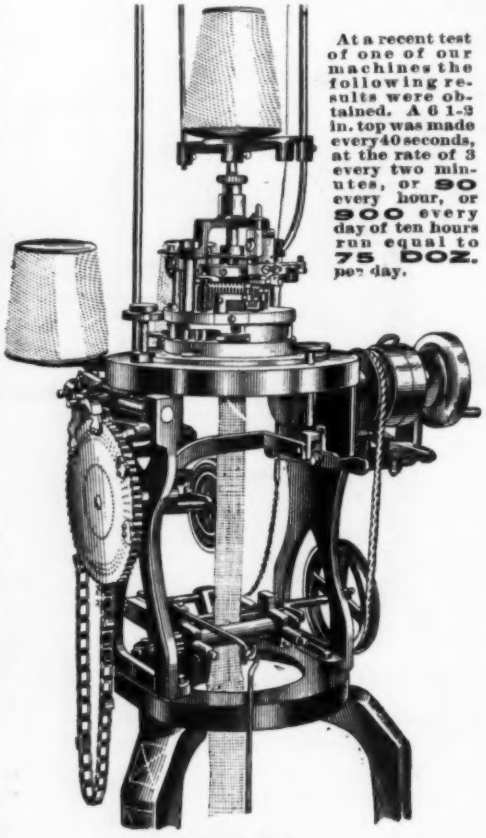
We manufacture all kinds of Latch Needles of superior quality.

Manufacturers of Mittens

will learn something EXCLUSIVE, an entirely NEW and NOVEL FEATURE in fabric for mittens, by writing at once. (Sole agency for the use of this particular fabric may be obtained) Nothing near it ever produced.

THE UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF PENNSYLVANIA HAS RECENTLY RENDERED A DECISION IN THE CASE OF THE MCMICHAEL & WILDMAN MFG. CO. AGAINST THE RUTH AUTOMATIC KNITTING MACHINE CO., AND DECIDED THAT THE NEW PIN AND SLOT CONNECTION, DEVISED BY MR. GEORGE W. RUTH, SUPERINTENDENT OF THE RUTH CO.'S FACTORY, IS NOT AN INFRINGEMENT.



At a recent test of one of our machines the following results were obtained. A 6 1-2 in. top was made every 40 seconds, at the rate of 3 every two minutes, or 90 every hour, or 900 every day of ten hours run equal to 75 DOZ. per day.

"We have just been granted the claims for the extreme OPEN WORK in LACE EFFECTS carrying over of more than one stitch, the original lace work was merely the carrying over of one stitch, which of course did not have much of an effect. The carrying over of two or more stitches is ORIGINAL with our Mr. Geo. W. Ruth in Rib Knit Goods. We have very BROAD CLAIMS covering this distinct feature and will use our best efforts to PROTECT users of RUTH machines from competition of others who may be trying to produce same work on machines of other makes."

Orders are now received for the new RUTH STOP MOTION and will be filled promptly, the trouble which has delayed delivery of this stop motion has been overcome.

The RUTH SPECIAL needles are being taken hold of by the trade, and many favorable comments are being received for this, a recent product of the HOME OF IMPROVEMENTS IN KNITTING MACHINES.

PATENTEES AND MANUFACTURERS OF

Ruth Ribber, Ruth Sleever, Ruth Splicer, Ruth Automatic Stop Motion, Ruth Lace Device, Ruth Friction Pulley, Ruth Belt Shift, Ruth Needles.

RUTH AUTOMATIC KNITTING MACHINE CO. Box T-W, YORK, PA,

We have a proposition for ever manufacturer of Hosiery! Have you heard of it? Write at once.

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ALWAYS IN THE LEAD

OUR

Fall 1904 Line

now ready and being
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NYE & TREDICK COMPANY,

MANUFACTURERS OF

Circular Rib Knitting Machinery,

UNDERWEAR MACHINERY,

For Ladies' Vests, Combination Suits, Corset Covers, etc., Men's Underwear, Sweaters, etc.

New Improved Sleeve Machines, Machines for Rib Hosiery, Rib Tops and Cuffs.

LATEST IMPROVEMENTS ON ALL MACHINES.

MECHANICAL STOP MOTIONS

For Circular Rib Knitting Machines.

OFFICE AND SHOW ROOMS:

606 ARCH STREET, PHILADELPHIA.

The "INVINCIBLE"

A machine of the highest grade.

Practical and Economical in operation.

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Gauge of machine changed by simple changing cylinders.

The Invincible METHOD OF TRANSFERRING RIBBED TOPS is quicker and more positive than others.

No experience required to transfer ribbed tops by this method.

YARN CHANGED automatically without revolving bobbins.

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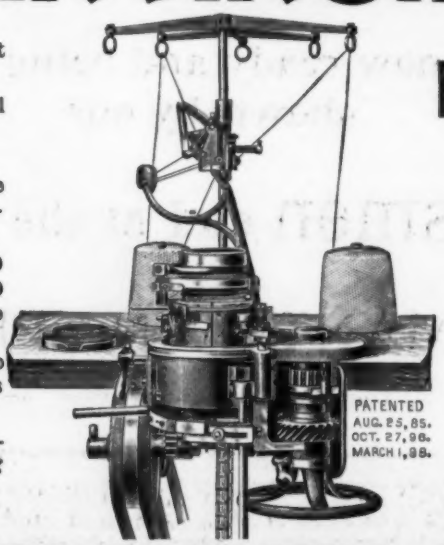

Full Automatic Knitting Machine

For all kinds and gauges of

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CIRCULAR KNITTING MACHINES

Either plain or full automatic, with stop motions complete, for

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The Leighton Circular Machines are the only ones which **Rack** or **Shog** the needles for fancy borders; also built for automatic striping; and with from 4 to 16 feeds for underwear.

Also Builders of ABEL WINDERS, SEAMERS and LOOPERS.

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Latch Needles

For all Knitting Machines.

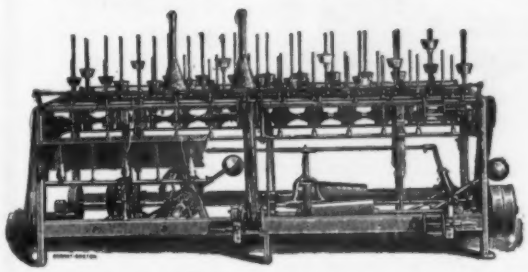
Our Superior or Sunken Rivet Head Needles

Will save you money every day in the year.

Dodge Needle Co., Manchester, N.H.

We now build, with or without differential motion, for winding on Bobbins from Skein or Cop,

THE ABEL WINDERS



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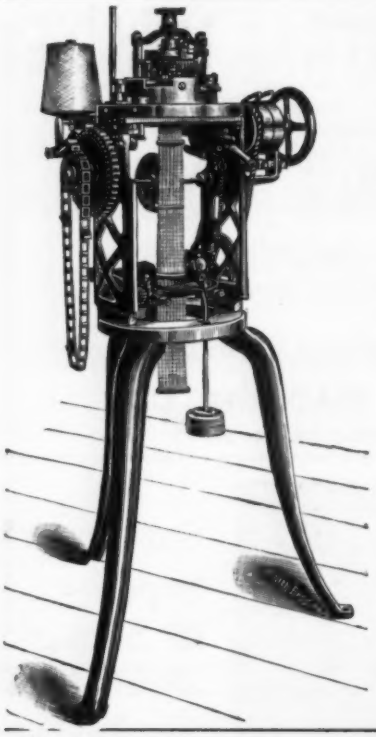
IN CONNECTION WITH OUR LINE OF

AUTOMATIC RIB KNITTING MACHINERY.

LEIGHTON MACHINE CO., Manchester, N. H.



H. Brinton & Co.

213-215 Race Street, Philadelphia, Pa.

BUILDERS OF

Knitting Machinery

For HOSIERY and UNDERWEAR.

Complete Estimates Furnished. Send for Particulars.

The cut shows our **Improved Automatic Ribber** with Welt and Slack Course for Half Hose, Tops and Ribbed Legs.

Adams Rib and Top Cutting Machine

FULLY AUTOMATIC.

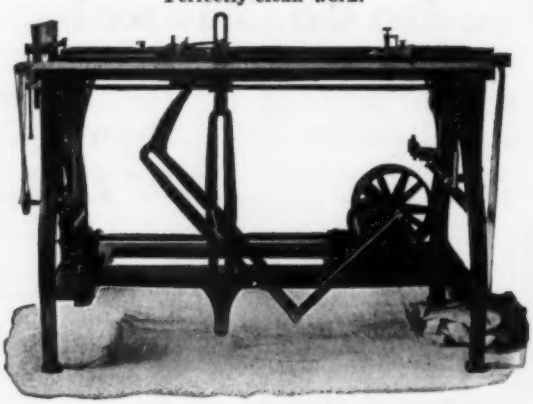
Cuts all Fabrics with or without Welts. Requires no trimming after passing through machne. Perfectly clean work.

Solidity.

Simplicity.

Absolute Positive Movements.

Best Materials.



Cutting and Working Parts Hardened Steel.

Easy Running.

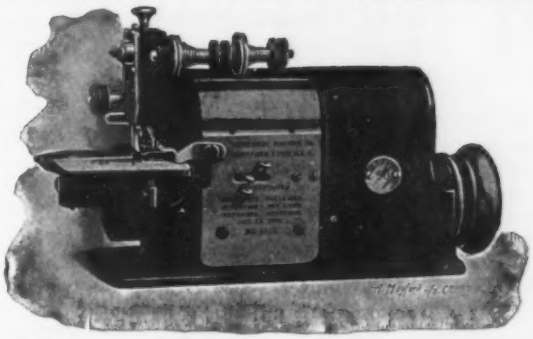
False Welts cut out automatically. 1,500 dozen pairs, cut per day by one operator.

Saving of Labor and Goods. Can be operated by boy or girl. Accidents impossible. No Special Attachments. Patented in the U. S. A. and Europe.

Sole Manufacturers and Agents for the U. S. A.,

McMichael & Wildman Manufacturing Co., Norristown, Pa

THE CHEAPEST and BEST METHOD
OF
FINISHING RIBBED KNIT GOODS
IS BY THE USE OF
OUR HIGH SPEED MACHINES.



BLANKETS, SKIRTS or COTTON GOODS,
requiring a useful and Ornamental Finish, should be finished by some of our various machines adapted for special purposes and finishes.
Send for Catalogue and Samples, stating the kind of goods to be finished.

THE MERROW MACHINE CO.,
346 Broadway, New York. HARTFORD, CONN. Bourse Bldg., Phila.

Universal Cutter Co.
4567-4569 SCOTT AVE., ST. LOUIS, MO.

FRED BAUMANN, Jr., Eastern Mgr., 467 Broadway, NEW YORK.

CUTTING MACHINES

Made to be operated by direct current, 110 or 220 volts.

What electric current have you?

UNIVERSAL CUTTER will do the work BETTER and cut a GREATER quantity of Knit Underwear, or Fleeced Materials, than any other Cutting Machine on the market. : : : :

Made in 3 sizes Circular Knives:—Gem, 3 1-4 inch Knife, weight 15 lbs.; Prima, 4 inch Knife, weight 24 lbs.; Giant, 5 1-2 inch Knife, weight 27 lbs. Two sizes straight or Reciprocating Knives. Send us sample of material you desire to cut, stating thickness you want to cut at one time, and we will advise you as to which size is best adapted to your wants.

JAMES TAYLOR,

835 Arch Street, - - - Philadelphia, Penn.

KNITTING MACHINERY

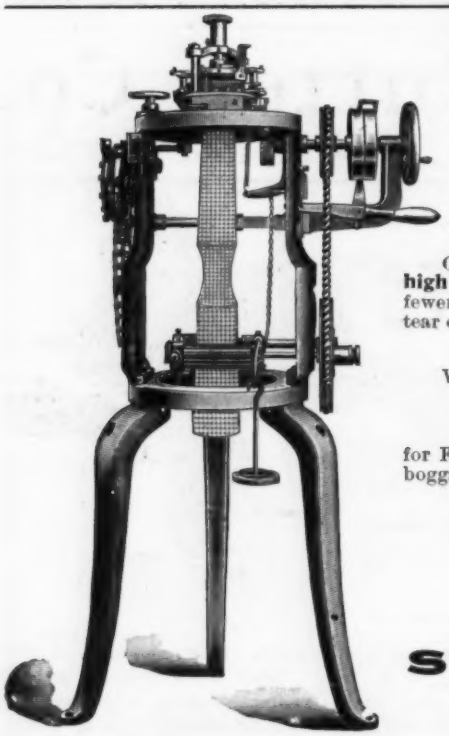
OF ALL KINDS. **NEW AND SECOND HAND.**

A RARE OPPORTUNITY TO BUY.

4 Hosiery presses.
1 Troy Hydro extractor.
1 Uhlinger hydro extractor.
4 Lamb knitters.
20 Hepworth & Beattie loopers.
1 Lathe.
1 Skein winder.
16 Champion, N. & T, and S. & W. underwear machines.
60 Ribbers and sleevers.
60 Brinton 3-4 auto- knitters, sizes.
27 Standard A automatic knitters.
5 Union Special trimmers.
2 Union button sewers.
100 welters and trimmers.
1 W. & W. cat-stitch machine.

WRITE FOR COMPLETE LIST.

We are always in the market to buy good second-hand Knitting and Finishing Machinery.



High Speed Rib Knitting Machinery.

Our latest model machinery has been designed to run at **very high speed,** giving large production. This is accomplished with fewer seconds, less breakage of needles, less jar and wear and tear on machines than has been customary at lower speeds.

We also make Special

STRIPING AND DESIGNING MACHINES

for Fancy Golf Stockings, Bathing Suits, Sweaters, Toques, Toboggan Caps, Skirts, etc.

Our Machinery gives large production at low cost and enables manufacturers to meet the market always and make a profit.

STAFFORD & HOLT,

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Hemphill Machine Co.

... BUILDERS OF ...

FULL AUTOMATIC HOSIERY KNITTERS

FOR
SEAMLESS HOSIERY.

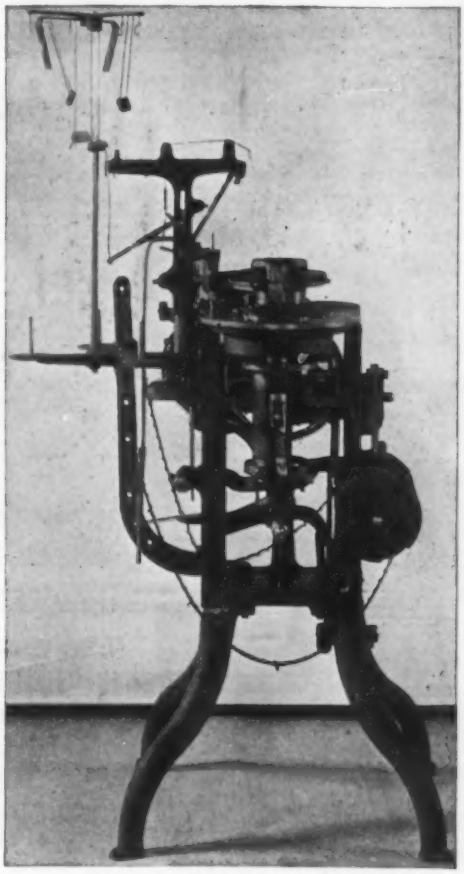
Superior to all because it has less parts.

Requires less repairs.

Easier to operate and

Produces More Work

with fewer seconds.



SIDE VIEW.

All Styles and Guages.

Yarn Changing Device for Heel and Toe.

Plaiting Device.

One needle pick for all operations.

Easy access to needles and sinkers.

Extra long bearing for cylinder, ensuring more even knitting.

SIMPLE, SURE AND ECONOMICAL.

These machines are on exhibition at the factory and references from several first-class manufacturers will be given on application.

Machines will be installed on approval for 30 or 60 days in any responsible concern.
Fully Guaranteed.

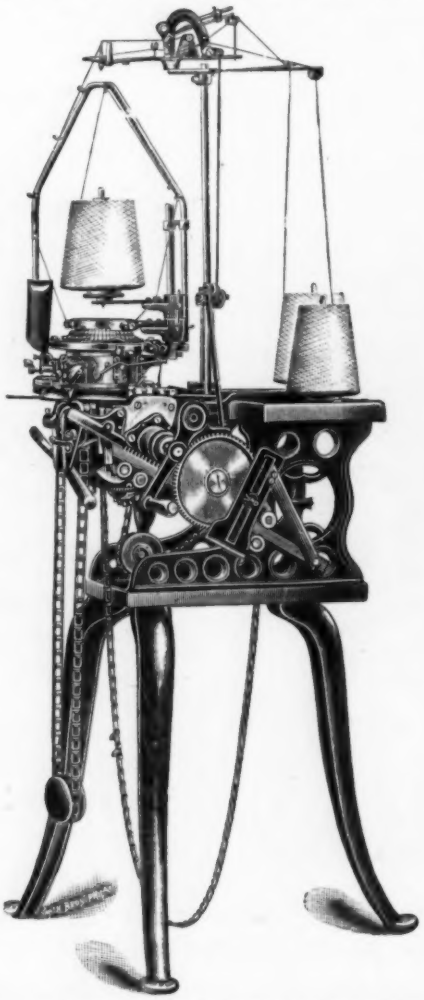
PAWTUCKET, RHODE ISLAND.

EXCELSIOR

Knitting Machine Mfg. Co.

BUILDERS OF

KNITTING MACHINERY



Two-Feed 7-8 Automatic for Ladies String Work, also Black Legs with White Feet.

Regular 7-8 Automatic for all classes of Cotton Hose. Special 3-4 Automatic for Wool.

Allentown, Pa., U. S. A.

National Spring-Beard Needle

MACHINE

For Seamless Hosiery.

The only Machine on which the speed is advertised.

This Tells the Whole Story.

Best results guaranteed at 300 to 400 revolutions per minute, according to guage, hence the largest production by 25 to 40 per cent. overall other machines. Least cost for repairs, smallest needle breakage and lowest per cent. of menders. Full automatic, practical double-sole and high-heel splicer. Device for producing a great variety of lace effects, with no breakage of stitches and no infringement.

For full particulars, call or address

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724, 726, 728 Cherry Street,

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The CRAWFORD

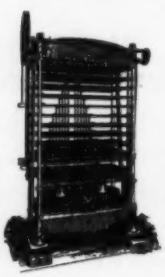
HOLLOW STEAM

PLATE PRESS

For Knit or Woolen Goods.

The most reliable machine of the kind on the market.

PRESS PAPERS and FENDERS.



SPENCE & RIDEOUT,

Successors to
J. J. CRAWFORD & SON,

NASHUA, N. H.

Established 1868.

PAXTON & O'NEILL'S

3-4 AUTOMATIC KNITTER

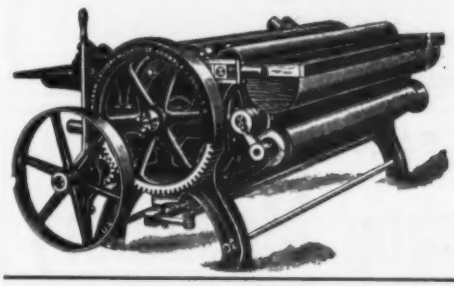
FOR ALL KINDS AND GUAGES OF SEAMLESS HOSIERY.

Has the preference wherever used over 7-8 and full automatics. Because it makes as much or more goods and better goods. Costs less for repairs. Gives less trouble to fixers. Range on Half Hose, from the coarsest to 260 needle.

Exclusive rights to BROWN'S ATTACHMENTS FOR LACE EFFECT.

Cylinders and Dials for all size Machines. **127 Bread Street, Phila.**

AUTOMATIC IRONING and PRESSING MACHINE for KNIT GOODS.



This machine irons and presses ribbed and flat underwear, giving a fine, smooth finish and most attractive appearance to the goods, not to be obtained in any other way. It does not break buttons. Inexpensive and easy to operate, and has large capacity. Knitting mills using them are greatly pleased with results. This method of finishing is sure to come into universal use. Send for further particulars to

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SOUTH NORWALK, CONN.

HEPWORTH & CO.'S

Patent Single-Stitch

LOOPING MACHINE.

Needle working from the inside, avoiding the breaking of needles and points and picking up the metal.

Single and Double Stitch, or Both Combined.

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BOARDS FOR FAST BLACK DYERS.

HOSIERY FINISHING BOARDS.

BEST WORK. PROMPT SERVICE. PRICES ALWAYS RIGHT.

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Hosiery Boards.

WE BUILD SIMPLE BUT EFFECTIVE MACHINERY FOR

WASHING, FULLING, RINSING, DYEING AND BLEACHING HOSIERY AND UNDERWEAR

¶ Where we have put in one machine we have almost always put in others.
¶ We also build Hydro-Extractors and Machines for Pressing and Ironing Knit Goods without injury to the buttons.
¶ Write for our special textile circular and prices.

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See illustrated description of our machine for washing and scouring knit goods, in this issue.

WOLFGANG RICHTER,
Importer and Builder of
Full Fashioned Knitting Machinery
N. E. Corner Third and Green Streets,
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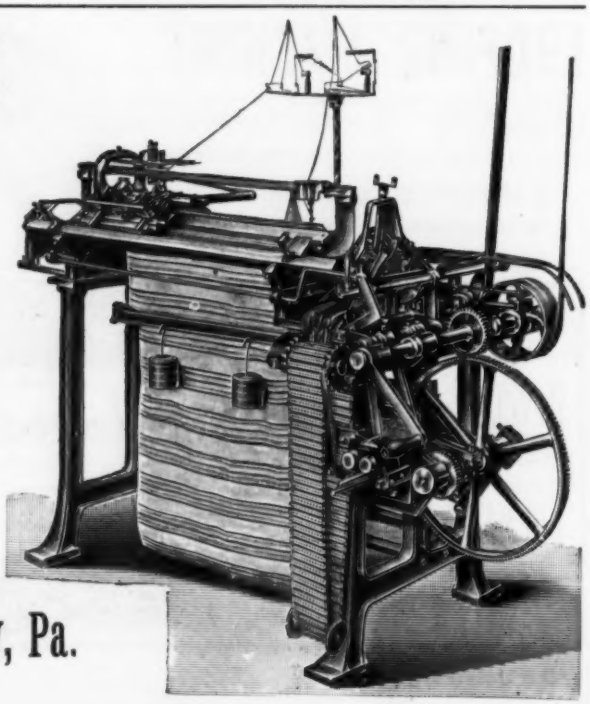
German Knitting Machinery

For Fancy and Full Fashioned Goods.

Our Specialties are for Machines for Knitting **SWEATERS, GOLF JACKETS, FANCY VESTS, Etc.,** in **Plain, Honeycombed** and **Other Fancy Stitches.**

Our Steam Power Machines are fully Automatic. One operator attends four machines.

Also Hand Power Machinery. Also Underwear, Glove and Mitten Machinery.



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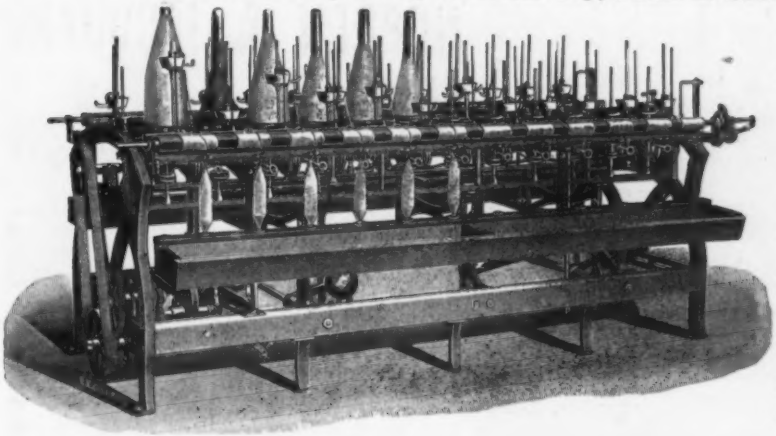
OVER 1,400 PAYNE WINDERS IN USE

For Hosiery Mfrs., Wind for Cop, Skein or Bobbin.



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GEO. W. PAYNE & CO

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Builders of the

Improved

Upright Spoolers,

To Spool from Cop, Skein or Bobbin.

Doubling Spoolers, for doubling 2, 3, or more ends into one,

Upright Quillers, Quill from Cop, Skein or Bobbin.

Ring Dresser, Spooler and Reel Spindles, Cop Skewers, Warp, Spool, Spooler, Guides, Bolsters and Stops Made and Repaired at Short Notice.

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MANUFACTURERS OF LATCH NEEDLES

We can furnish you needles for any make of machine that you use. We number among our customers, the best known mills in this country. We will be pleased to estimate on any line.

KEYSTONE KNITTING MACHINE MFG. CO., 2600 North Sixth St,, Philadelphia, Pa.

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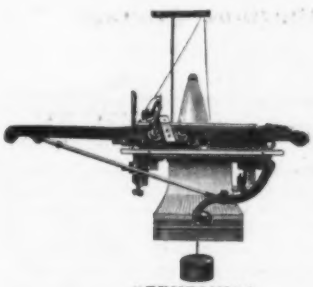

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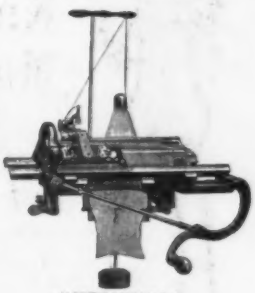
BUILDERS OF ALL KINDS OF

Flat Knitting Machines

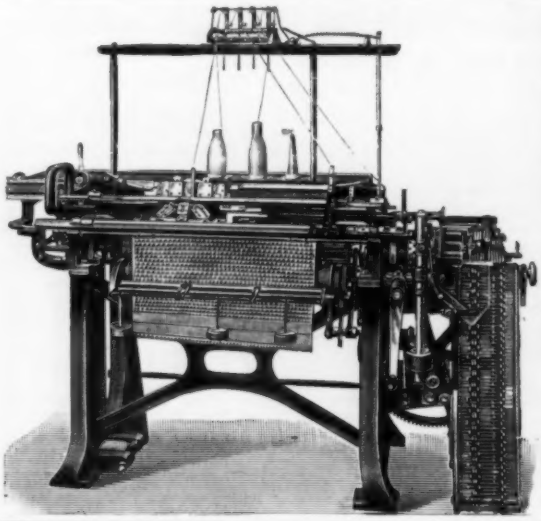
(LATCH NEEDLES.)



"HELVETIA"

More than thirty different Models of **Hand Knitting Machines.** Special Machinery for Fancy Gloves, Fronts of Cardigan Jackets, Golf Hose, Sweaters, etc., etc. **Patentees and Sole Makers of the "TEUTONIA" KNITTER** the very best hand-machine for the manufacture of plain, seamless hose and half hose with Griswold heel, narrowed leg and toe. **FULL AUTOMATIC POWER KNITTING MACHINES, Independent Heads,** for making Rib Tops, Sweaters in 1 and 1 and Half Cardigan Rib, 2 and 2 Ribbed Ladies' Vests, Scarfs, Shirt and Shaker Bodies, etc. **FULL AUTOMATIC FANCY JACQUARD KNITTING MACHINES, Power Motion. AUTOMATIC NARROWING MACHINES—Power Motion—3, 4, 6, 8, 10 heads** for making plain, seamless legs of Ladies' Hose (full fashioned), plain, fashioned seamless Pants and Sleeves, Ribbed Pants and Sleeves, Cardigan Jackets, Cardigan Sleeves (narrowed and widened), etc.

Sole Agent for the United States, JULIUS MULLER, 132 Melrose Street, Brooklyn, N.Y.



Full Automatic NOPPEN & JACQUARD MACHINE

For High-Grade Sweaters, Jerseys, Etc. in latest plain and colored patterns.

Most durable, simplest construction! Easy to operate and adjust! Recognized as the Best in the market. One operator attends to 3 of these machines! Only reliable machine for above articles.

HIGH SPEED! LARGE PRODUCTION!
IN USE EVERYWHERE!

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Ask for samples and full particulars. State gauge and size you need.

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For Ladies', Gents', and Children's Goods.
LATEST STYLES.
BEST WORKMANSHIP.

MAKER OF

Drying Form Boards

OF EVERY VARIETY.

Pepper Machine Works

Lakeport, N. H.

Successors to
Pepper Manufacturing Co.

Manufacturers of

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INCLUDING

Pepper's Flat Ribbed Cuff Machines,

Automatic Welt and Loose Course Machines for Stock Tops. New Circular Stripers with Welt, Loose Course and Striping (Automatic), for Short Cuffs, Sock Tops, Hose Legs, Wristers, etc.

Golf and Bicycle Stocking Machines,

ALL KINDS OF

CIRCULAR RIBBED MACHINES

For Men's Underwear, Ladies' and Misses' Hose Legs and Leggins.

Correspondence Solicited.

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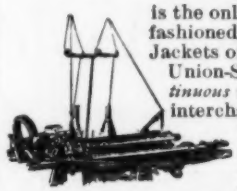
PHILADELPHIA .. .. PENN.

The best equipped shop in the United States for the Manufacture of

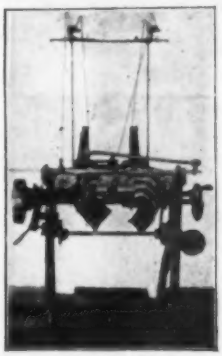
Knitting Machine Cylinder

and Sinker Bed Ring Forgings, from the smallest to 30 in. dia. of the best steel.

The Grosser PATENT FLAT KNITTING MACHINE



is the only reliable machine for full-fashioned Sweaters, Cardigan or Golf Jackets or Vests, Gloves, Underwear, Union-Suits, etc., that gives *continuous* satisfaction. All parts are interchangeable on our new style. The only automatic Machine for Jacquard Honey-Comb or Seamless Shaker Sweaters. We have the only first class High Speed 2 thread Lockstitch Overseamer for selvedged Knitgoods, that will sew in Sleeves or hem in double Bottoms on Sweaters without puckering. *ARTHUR MUELLER, 780 Madison St, Brooklyn, N. Y. Telephone 665a Bushwick.*



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LINDLEY'S NEW AUTOMATIC POWER GLOVE FINGERING MACHINE

Germantown Skein Winder and Links for Double Ribs. Cardigan Jacket and Circular Knitting Machines for Shirts and Hosiery.

Cylinders and Dials of all kinds made and hardened. Special Machine and Jobbing Work promptly attended to. Also equipped to do general repairing of Platt's Cotton Spinning Machinery. Correspondence solicited.

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Now is the time to fit your Drying Rooms.

We offer the cheapest and best Dryer ever offered to the trade.

Correspondence and Inspection Solicited.

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Hydro-Extractor Guards,
Crimping Machines,
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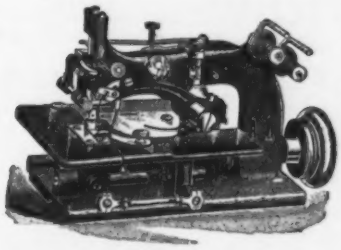
THE

Champion Rib Knitting Machines

For HOSIERY AND UNDERWEAR



Also Sewing and Trimming Machines, Crochet and Shell Machines, and all other Machinery required in the finishing of Hosiery and Underwear. Complete Plants Installed.

Estimates Cheerfully Given.

Our New Overseaming Machine.

CHAMPION MACHINE CO.,

N. W. Cor. American and Diamond Sts.

PHILADELPHIA.

A. McMICHAEL,

Machinist,

Repairs to Hosiery and Underwear Machines, Cylinders and Dials of every description.

FINE MACHINE WORK.

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We HARDEN all CYLINDERS and DIALS large and small.

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NUMBERING MACHINES FOR ALL PURPOSES
Send for Estimates and Catalogues.

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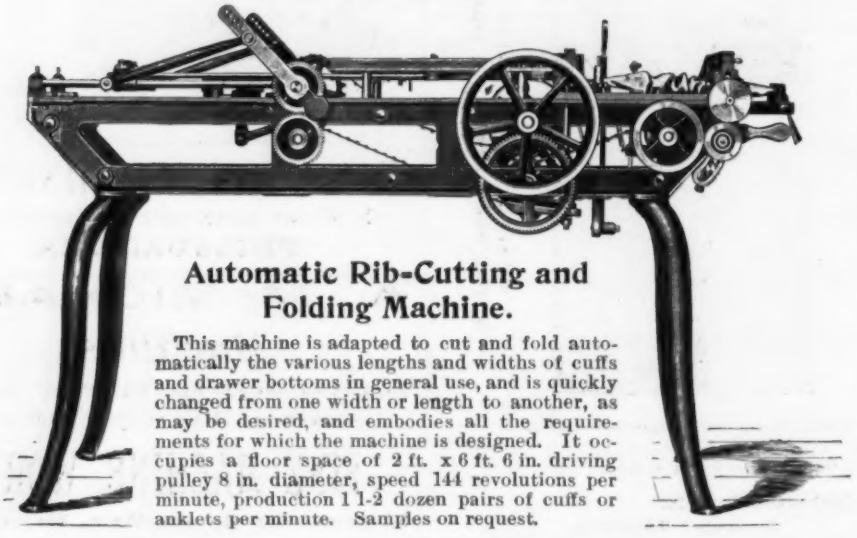
SPRING NEEDLE CYLINDER RIB-TOP MACHINES For making Cuffs, Drawer Bottoms and Shirt Borders.

SPRING AND LATCH KNITTING NEEDLES, BURR WHEELS, BURR BLADES, SINKERS, JACKS, ETC. COLLARETTE ATTACHMENT.



Automatic Rib-Cutting and Folding Machine.

This machine is adapted to cut and fold automatically the various lengths and widths of cuffs and drawer bottoms in general use, and is quickly changed from one width or length to another, as may be desired, and embodies all the requirements for which the machine is designed. It occupies a floor space of 2 ft. x 6 ft. 6 in. driving pulley 8 in. diameter, speed 144 revolutions per minute, production 1 1-2 dozen pairs of cuffs or anklets per minute. Samples on request.

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MANUFACTURERS OF

LATCH NEEDLES

of all kinds. Warranted in every respect.

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MANUFACTURER OF

Screw Riveted Balmoral and Double Rib NEEDLES

(Patented May 6, 1890.)

All Work Guaranteed. MANCHESTER GREEN, CONN.

WM. COREY CO.,

Manufacturers of Knitting Machine

Latch Needles,

MANCHESTER, N. H.

EXCELSIOR NEEDLES.

The best Hosiery Needles in the market.

Manufactured by

WARDWELL NEEDLE CO., Lakeport, N. H.

Manufacturers' Supplies Co.

418 ARCH STREET, PHILA.

Needles and Supplies for Knitting Mills.

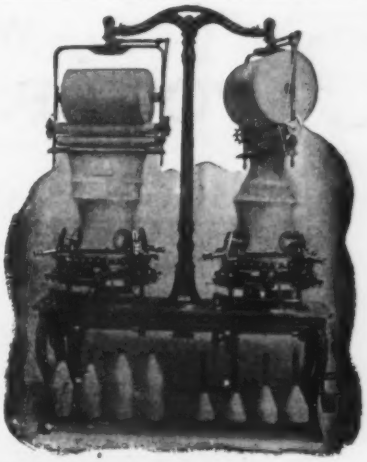
Agents for EXCELSIOR NEEDLE CO., and NATIONAL NEEDLE CO.

FREEMAN BROS.

Manufacturers of

Latch Needles

Harmony Block, BRATTLEBORO, VT.



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Knitters, Winders, Burrs, Attachments.

The New "Victor" KNITTING MACHINE.

A full automatic seamless machine, thoroughly interchangeable in all its parts. More simply constructed than any other.

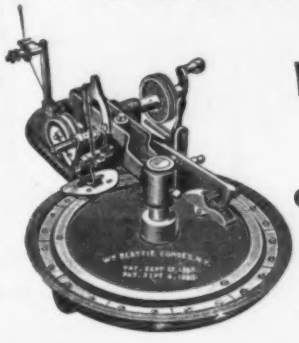
Also full automatic **Two-color Striping Machine** and full automatic combination lace and stripe machine.

AMERICAN KNITTING MACHINE CO.,

Office and Shop, Woonsocket, R. I.

Beatties'

PATENT LOOPERS



Wm. Beattie & Son,

COHOES, N. Y.

An Illustrated Catalogue will be sent on application.

TRADE MARK.

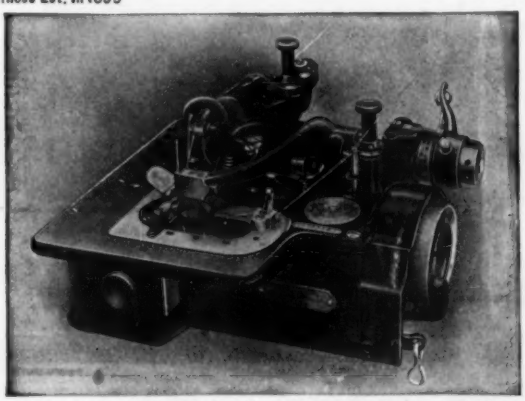
Business Est. In 1859

WILLCOX & GIBBS

"OVERLOCK" Machine.

(TRADE MARK.) (Pat. April 5, 1892.)

Patent twice upheld by the U. S. Court of Appeals.



For Trimming, Seaming (or Hemming, or Overedging) and Covering Raw Edges in One Operation of Knit Underwear and Hosiery; and for making Overlock Corded Edge on Woven Fabrics.

WARNING!

Manufacturers and dealers are warned that not only is the "Overlock" Machine fully protected by our four patents of April 5, 1892, one of May 26, 1896 and one of August 11, 1903, but the edging products are also protected by patents of March 10, 1896, Dec. 26, 1899, and August 11, 1903.

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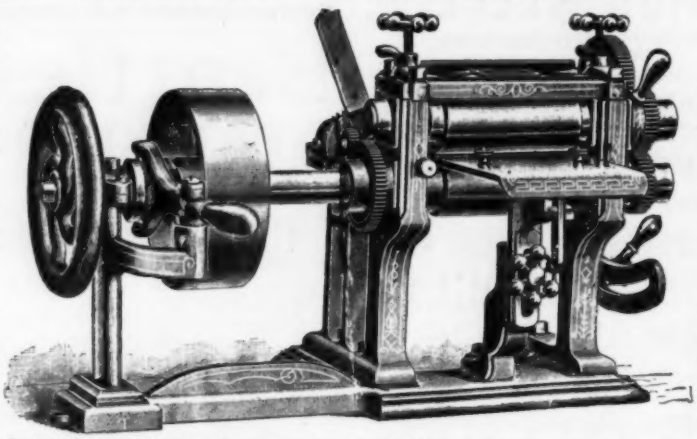

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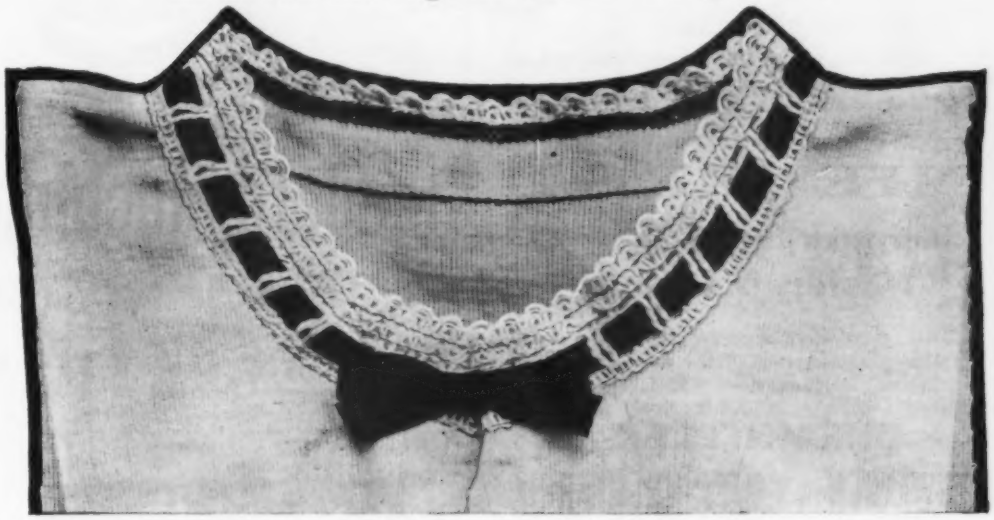
Stitches lace on opposite sides of ribbon and covers raw edge of web in one operation.



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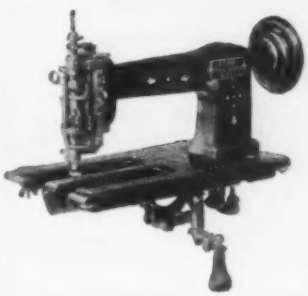

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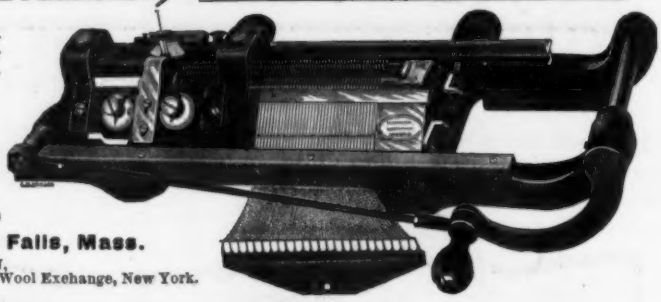

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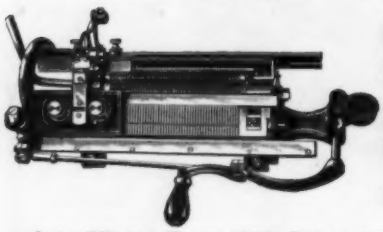

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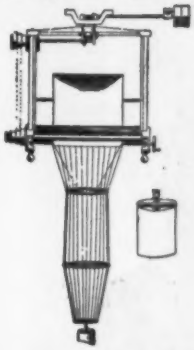
The Johnston Patent Improved Vertical Dryer



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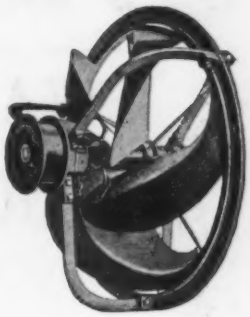
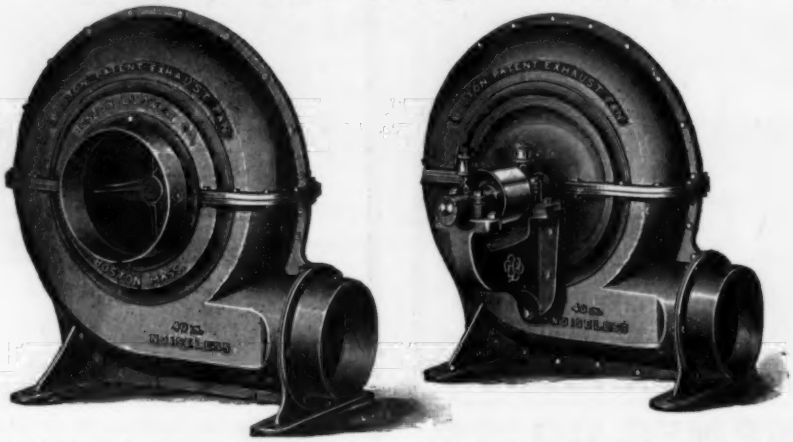


Boston Wool Exhausters, with Removable Tops.

As used in Connection with Pneumatic Conveyor System for Handling Wool, Cotton, Rags, Excelsior, Jute, etc.



Inlet Side of Right-hand Wool Exhauster. **Pulley Side of Left-hand Wool Exhauster.**

This machine is similar in design to the regular Boston Patent Exhaust Fan, but is fitted with a special wheel for handling fibrous materials, and the top is removable.

This latter feature is especially desirable when handling wet or greasy materials or in handling anything, in fact, which would leave a deposit on the inside of fan, as the entire top may readily be removed for inspection or cleaning without disconnecting either pipe or belt connections.

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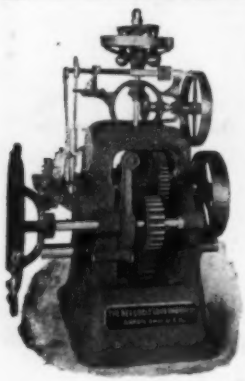

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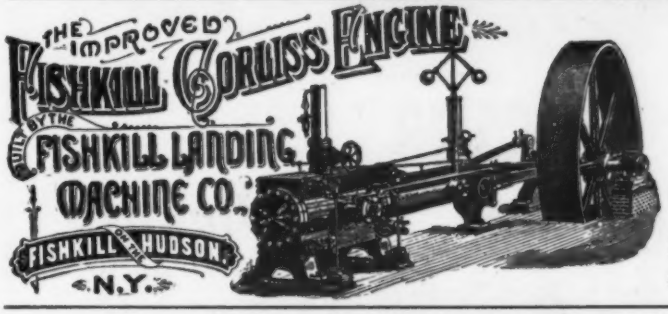

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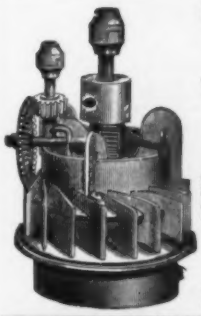

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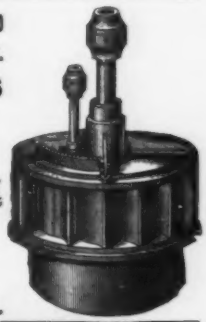

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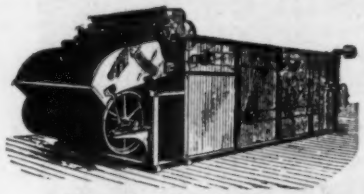

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For Cotton Stock, Wool Stock, Rags,
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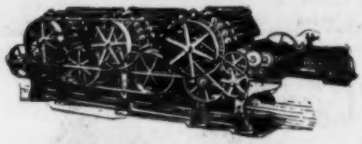

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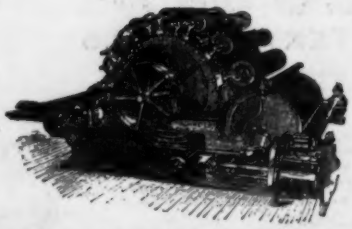

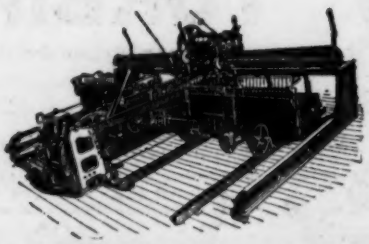

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